A McGraw-Hill Publication

Journal of Electricity and Western Industry

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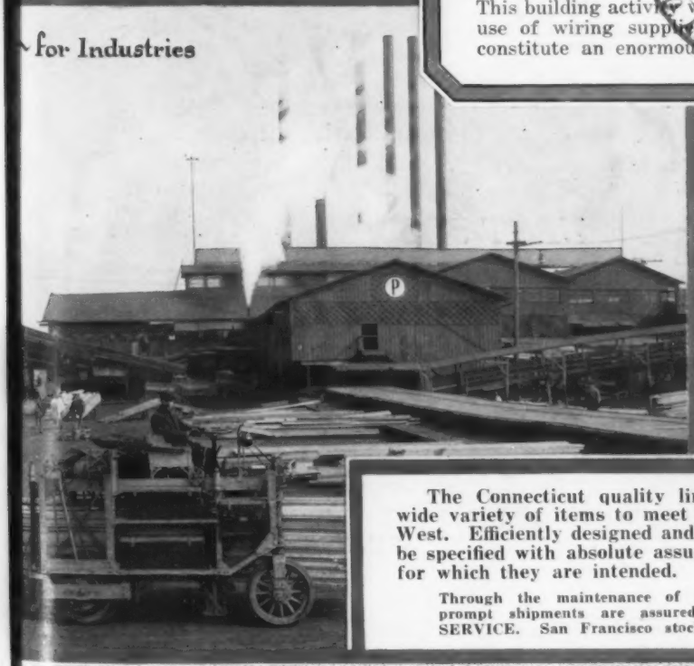
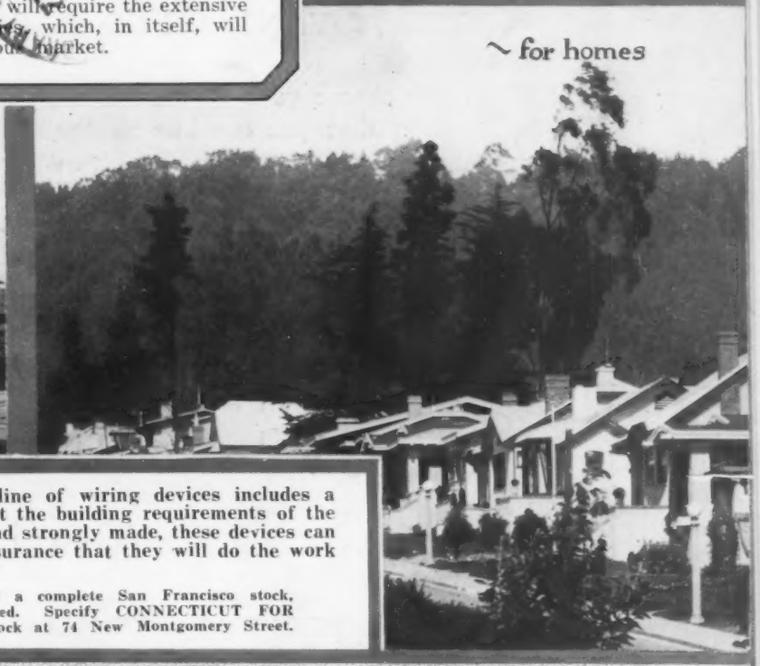
October 15, 1922

San Francisco

Four and a Quarter Billion will be Spent in Ten Years

The West looks forward to unprecedented building activity during the next ten years. Conservative estimates place the expenditures for office buildings, mercantile structures, industrial plants and homes at $4,230,000,000. This building activity will require the extensive use of wiring supplies, which, in itself, will constitute an enormous market.





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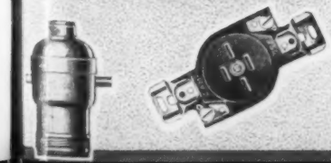

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Some "V.V." Time Savers

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The same Fitting with covers in reversed position—two types in one

TYPE "T"

The same Fitting again with covers in reversed position—two types in one

TYPE "LFB"

Covers on two sides—front and back—again two types in one

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Crawford Ranges

The New Ambassador Apartments, a nine-story building in Portland, Ore., containing 49 five-room apartments of the most modern type. The Portland Railway Light & Power Co. installed in each home an 18-70 Crawford Electric Range.

An excellent example of Domestic Load

FRANKLIN T. GRIFFITH, president of the Portland Railway Light and Power Company, made the statement in late 1921 that "the outlook for the electrical industry in Portland and vicinity is encouraging. The use of electrical energy is steadily increasing. The most marked increase in consumption during the past year and in immediate prospect, has been and will be in further development of the use of energy in the homes of the people."

When he made that statement he had in mind just such use of energy in the home as the installation of 49 new Crawford Electric Ranges in this splendid new Portland apartment building. For that installation translated itself at once into a sharp upward trend and a steady new plateau in the domestic load curve.

This installation would not have been made with Crawford Electric Ranges unless experienced commercial men and electrical experts had been convinced, by severe test and tangible demonstration that "The Crawford Made Electric Cooking Perfect."

The Crawford Electric Range will supply a tonic to **your** domestic load curve.

The Crawford Plan gives every central station executive a chance to combine his energy with our own to further the use of electricity in the homes of the people. It's a plan to sell the best range in the best way. Have you seen it?

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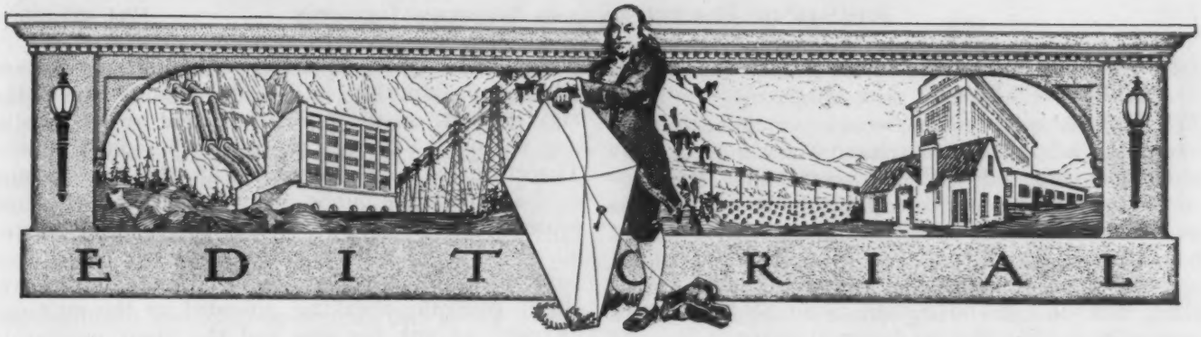


The Everlastin' Teamwork

THERE are two essential elements that constitute good electrical service. One embraces the physical characteristics embodied in the delivery of electrical power and the other is an intangible something that adds immeasurably to the satisfaction of the consumer. That the physical element may be properly administered, the utility rendering the service must keep abreast of the times in engineering design and installation. It must render the service at reasonable rates and the consumer must always feel that proper safeguards have been legally established by which he is assured of fair play.

OUR readers are fully aware not only that hydroelectric development of the West leads the world in engineering achievement but that California and other western states deliver power to consumers today at prices below those prevailing elsewhere in the nation and with it all, the protection to the consumer afforded by such regulatory bodies as the California Railroad Commission has established national standards of efficiency too well known for us to dwell at this time on this phase of service.

BUT of the intangible element of service, little has been said. The attention of the utility world was first called to the high character of intangible service in the West by the Journal of Electricity and Western Industry through the publication of a series of articles by S. M. Kennedy of the Southern California Edison Company which have later appeared in book form entitled "Winning the Public." The fulfillment of the highest ideals of this intangible service requires men of wide vision, initiative and imbued with the cooperative idea. Some years ago the California Citrus Growers' Association startled the entire business world by the constructive manner in which they built up their markets in the East through cooperative effort—markets that have returned to the West in twelve years the huge sum of two hundred million dollars with a loss of only ten thousand dollars incurred in bad debt collections.

NOW comes the electrical industry, thirty-five thousand strong, working as one man to consummate a great ideal. And how wonderfully that ideal has been achieved through the service rendered by western utilities can only be realized by personal contact with the communities of the West where this service is administered. This issue of the Journal of Electricity and Western Industry is designed to present specific instances of what this intangible service is doing for the upbuilding of the West. From the cheerful manner in which the western utility telephone operator courteously answers the phone, "Good morning, Mr. Jones, this is the Sacramento-California Power Company," to the speed and efficiency with which the motorcycle trouble-shooter hastens to the home to replace a fuse, this intangible element of service stands out in the West as a distinct contribution to the economic welfare of this region.

IT is done through the cooperative effort of well designed machinery and skilful installation. It is accomplished through well trained linemen, office workers and operatives off in the high fastnesses of the Sierras, Cascades or Rockies. It is the synchronous working of the master mind of the executive passed on down the line through the thirty-five thousand workers in every branch and phase of human activity included in the great electrical industry of the West. Indeed, as Kipling said,

"IT'S THE EVERLASTIN' TEAMWORK
OF EVERY BLOOMIN' SOUL."

Everything to Lose and Nothing to Gain!

THE bankruptcy courts would soon have to pass on the affairs of a merchant who, being already plentifully supplied with showcases and other fixtures, invested his entire capital in more showcases and fixtures and left himself nothing with which to buy merchandise.

The state of California, already plentifully supplied with cheap electric power, would seriously impair its credits if it issued $500,000,000 of bonds to go into the power business and left itself nothing with which to finance the construction of highways, schools and public buildings and the provision of other facilities that a state is bound to furnish its citizens.

The so-called Water and Power "Act," the constitutional amendment which will be voted on in November, proposes to have California do just this.

California today has cheaper and more plentiful power than any other part of the world. This is the result of hydroelectric development by private enterprise under state control.

Private capital is willing to continue the development of hydroelectric resources to keep pace with the needs of the industry and agriculture of the state. Private capital is not willing to build schools and highways and public buildings for California.

There is no need for California to go into the power business. There IS a growing need for the state to build many kinds of public works necessary for the convenience and the progress of the people.

The issuance of $500,000,000 of bonds would stretch California's credit to the breaking point. Even if the Water and Power "Act" accomplished everything that its advocates claimed for it, California would be no better off than it is at present, with the private producers of electrical power operating under the control of the State Railroad Commission. The people of the state have everything to lose and nothing to gain in the proposed experiment.

Tax the Highway Sign as Well as Exclude It From Right-of-Way

ON the ground that advertising signs along highways are conducive to accidents, an Oregon highway engineer has recently ordered the removal of all such signs that trespass on the highways. This is one more addition to the long list of protests against a public highway nuisance. In many states there is a statewide policy against allowing such signs on highway right-of-way and it is to be regretted that so far Massachusetts is the only state that has been able to prevent the erection of such signs on private property along the highways. The glaring sign board close to the highway, challenging every motorist who passes, is an imposition on the traveling public, and an offense to every lover of nature.

Because the owner of private property has been paid for the privilege, a bill posting company assumes the right to reap a benefit—and that in an objectionable way—from the public highway toward which it pays nothing. The advertising value of the sign depends on the highway owned by the public, and not on the private property whereon it stands. Therefore the first obligation of the bill posting company is to the public. Permission from the land owner is a secondary consideration—another matter altogether. As now tolerated, the bill board is a parasite on the taxpayer who pays for the highways. He is, generally speaking, offended by the nuisance as much as any one else and the great wonder is that he has so long endured the imposition. It is argued that in recent years higher standards have been adopted in bill board advertising. This is probably because those who profit therefrom have seen the handwriting on the wall.

It is significant that a national bill board posters' association retains legal talent on an annual basis which has much to do in combating ordinances and legislation adverse to their interests. Regardless of improvement in standards, the signs continue to be an accident menace, they mar the landscape and they commercialize, as far as they can but without any recompense, the time that the motorist desires to spend in enjoying the outdoors.

These are some of the reasons against signs along highways. The only reason for their presence there is that profit may accrue to certain individuals and companies. The American public is becoming less tolerant of this nuisance. Highway engineers have done well to exclude advertising signs from the right-of-way. It is now time to go one step farther and urge that each state legislature pass a law taxing the highway advertising sign that has so long enjoyed a privilege for which it has not paid.

Power Company Construction Program Anticipates Future Growth

APPROXIMATELY $75,000, or the equivalent of the wages of 15,000 men receiving $5 a day, is being expended daily by the Southern California Edison Company in its hydroelectric developments in the vicinity of Huntington and Florence Lakes in the Sierra Nevada Mountains, California. From this expenditure, which will continue at approximately the same rate for the next ten years, hydroelectric power plants will be developed, the total generating capacity of which will be over 1,260,000 hp. in 1935, although this great amount of power will be but 200,000 hp. in excess of the estimated connected load at that time.

The case of this company is not exceptional. In fact the universality of this far-seeing judgment of the power companies has made such expenditures items which are of little news value. Practically every company operating in the eleven western states is making similar plans for the future that an adequate supply of power may be at hand to meet the inevitable demand. At present there is a normal surplus of 200,000 hp. in the territory served by the Pacific Gas & Electric Company, but this company is developing still more electrical energy,

based upon the company's estimates that in 1930 ten billion kw-hr. will be used in California, or nearly three times as much as was generated in 1920.

The development of the West is certain to come and as a forerunner of great industrial growth goes the well-managed power company securing means for supplying power for the industrial plants that are sure to follow. Motive power is essential to the industrial success of the West and hydroelectric developments are going to furnish this power. Western power companies are now furnishing good and adequate service to their customers and they will continue to do so under utility commission regulation.

In what other industry is there such a thought to the future—what other class of directors are so concerned with the welfare of future generations as to plan and make developments ten years in advance of a demand for them?

Three Outstanding Problems in Long Distance Transmission

NOT only is the question of ever increasing voltage of our main transmission lines necessary to enable us to carry more power over the present installations one of great timely importance, but the problem of protection of this service and the maintenance of continuity are also factors of great importance. Hence, there is need at the present time for a device or system of devices that will even more thoroughly protect our power systems by means of relays so that a dangerous short circuit on one section will be instantly localized. And in connection with this, for economy's sake, all of our small hydraulic plants should be semi-automatic. That is, they should have no attendant except the watchman. As a factor in the betterment of continuity of service comes also the problem of developing cheaper auxiliary steam power in the West. Due to the increasing price of oil, we must increase our efficiency of the oil that we burn. Hence, it may well be said that three great outstanding problems of the day in interconnected service are, increasing the voltage of main transmission lines, the installation of relays for the isolation of break-downs in main lines with the companion problem of placing semi-automatic control in all hydraulic plants, and the development of cheaper auxiliary steam power.

A New Economic Triumph in Development of High Voltage Transmission

WE have recently witnessed the opening up of a transmission system in California designed for 220,000-volt transmission. These words alone mean little but their significance lies just here, that at 220,000 volts four times as much power can be transmitted as at 110,000 volts. Ten years ago, even five years ago, the Pit River power could not have been brought into the great agricultural and commercial centers of California at a cost that would enable the people to use it. As far back as thirty years ago the picture of the possibilities of the Pit was seen and the water rights were located and many efforts made to develop the power on this unusual river, but all of them came to naught simply because the power could not be carried down to the load centers at a cost which would make it economical to use the power. As great as was the 110,000-volt triumph in the past, if reliance were made upon this voltage for transmission of power from the Pit River development it would be necessary to have eight express lines of two circuits each, or sixteen circuits compared with the four circuits now designed to bring this power down to the load centers of California. In other words, the sum total of the result of going to this new high voltage is to reduce the cost of transmission exactly by half. Here then is an economic attainment of which the electrical industry may be justly proud.

Solidarity in National Engineering Society Development

ENGINEERS living in the eleven western states who are members of the national engineering societies, located as they are many hundreds of miles distant from New York headquarters of these societies, have to the man experienced great difficulty in keeping the proper tie-in with the parent organizations. This is due primarily to two causes: first, since engineering problems in these more remote districts are as a rule so entirely different from those prevailing in the more congested eastern centers, western men do not always find an outlet of expression in the national societies; second, the distance from headquarters is so great as to make it impossible both in the expenditure of time and money for members of the various local sections of the parent societies living in the far western states to maintain close contact by personal visitation with the national headquarters.

One of the great national engineering societies has consistently followed a wise custom over a period of years by paying annually the complete expenses of a delegate to the national convention from each duly established section, no matter how far that section may be situated from the national headquarters. This policy is one that could well be adopted by all of the national societies. The net result of this annual meeting of local section delegates at the New York headquarters is that today this national organization occupies a premier position among the great founder engineering societies in so far as its national solidarity is concerned. After discussion regarding the advisability of continuing this custom it was decided by this particular engineering society to continue the practice of sending sectional delegates to the national convention. This action is a wise one and will result in much benefit to the society. Far better would it be to cut down practically any other expense to be allowed in the budget than this most vital one concerning the sections of the society and the maintenance of contact throughout the length and breadth of the nation.

CURRENT COMMENT

Great Britain promises to far outdistance this country in the matter of radio broadcasting as the result of a new step which has been taken jointly by the government authorities and the manufacturers, in order to avoid what the London Times calls "The endless confusion which has resulted in the United States where broadcasting has been allowed to grow haphazard." Broadly, the British scheme is to have all broadcasting done by a single organization which will be sanctioned by the government, operated by the manufacturers of receiving sets and financed jointly by both.

Government to Control British Broadcasting

The six principal manufacturers of radio equipment in Great Britain have jointly formed a broadcasting company, stock ownership in which is available to themselves and to any other manufacturer of radio receiving equipment in the British Isles. Six broadcasting stations are to be established.

The question which is beginning to draw more and more attention in this country as to who shall pay the very considerable expenses of operating broadcasting stations and arranging satisfactory programs, has been solved in Great Britain in an ingenious way. Over there amateur receiving sets are licensed by the Post Office Department, paying a fee of 10 shillings, equivalent to approximately $2.20. This department has agreed to pay half of this sum to the broadcasting company. In addition to this share of the government's license fee the company will receive a sum based on the annual sales of each of the manufacturers who are members. Any profits which remain after the expenses of the various broadcasting stations are paid will be returned to the shareholders in the form of dividends.

In order to protect the radio manufacturers from competition, the government has agreed not to license any receiving stations which are equipped with other than apparatus made by members of the broadcasting company. The Post Office Department has also reserved the right to inspect all apparatus before giving its approval to a station. Home-made sets can be constructed and operated under this arrangement provided the 10 shilling government fee is paid.

It would seem that the British are determined to place broadcasting on the highest possible plane. American manufacturers are admitting that something is radically wrong with the present broadcasting scheme in this country. In many localities there have been rumors to the effect that central broadcasting stations were to be established, but as yet there has been no definite action. The fact remains, however, that something must be done to improve the programs which are being sent out in most localities.

Construction of a three-phase 20,000-volt transmission line connecting the system of the Mountain States Power Company at Myrtle Point, Ore., with the town of Powers, a distance of nineteen miles, in the record-breaking time of 33 actual working hours, is the feat recently accomplished by a construction crew of that company. The pole line parallels the right-of-way of a logging railroad and an electric crane was used to set the poles. The entire line consisting of 334 poles was set in 22½ hours. The wire was strung and laid upon the crossarms in 10½ hours. The accomplishment of this feat is another example of the service which the western power companies are ready to furnish at all times.

Transmission Line Erected in Record Time

The progress which has been made by the Federal Power Commission since its organization two and a quarter years ago is set forth by O. C. Merrill, executive secretary of that organization, in a paper read before the recent convention of the American Society of Civil Engineers in San Francisco. Mr. Merrill declared that the provisions of the Federal Water Power Act are adequate to protect every legitimate public interest. In recounting the work which has been accomplished, he said:

Work of Federal Power Body Is Reviewed

"That the Act also affords conditions under which capital may be secured for development purposes is evidenced by the results accomplished in the two and a quarter years in which the Act has been in effect. In this time there have been filed with the commission 348 applications for permits or licenses, involving an aggregate estimated installation in excess of 20 million hp. This amount is more than twice the existing water power installation of the United States. It exceeds the combined potential water power resources of Norway, Sweden, Finland and the Arctic and Baltic drainages of Russia—the chief water power region of Europe. It is nearly twice the combined resources of France and Italy.

It is more than six times the aggregate of all applications for power sites under federal control in the preceding 20 years. Up to Oct. 1, 1922, the commission had authorized 64 preliminary permits and 64 licenses, of which 25 were for transmission lines. The 60 permits now outstanding involve an estimated installation of 2,540,000 hp., and the 39 licenses for power projects, 2,040,000 hp., or a total of 4,580,000 hp. Of the projects covered by the 39 licenses, fifteen, involving an estimated installation when completed of 1,880,000 hp. and investments of not less than $250,000,000, are either completed or under construction. This is one and a half times as much as was constructed under federal authorization in the 20 years preceding the passage of the Federal Water Power Act. As a practical result of the present law there is probably more water power development now under construction than at any previous period in our history.

"By confining its activities primarily to applications for power projects, declarations of intention and requests for restoration to entry, the commission has been able to take final action on more than half of the applications for permits and licenses, or a total of 197. Of the remaining 151, 20 are not sufficiently complete for action to be taken, and action on 27 others must await prior action of other agencies. The commission has also rendered decisions upon 36 declarations of intention, passed upon restorations to entry in 200 cases and made withdrawals of 1,250,000 acres of public lands in connection with applications for power projects.

"While the two years' record is reasonably satisfactory, in view of the serious handicap under which the commission is working, the commission should, nevertheless, promptly be placed in a position where it would be possible for it fully to carry out the purposes plainly expressed in the law. The present situation necessarily results in an administration of the law which is insufficiently co-ordinated and only partially effective. The chief purpose of the creation of the commission was to secure a common policy and a single executive agency in water power administration. This purpose has not been accomplished. Other agencies are still continuing their independent activities and these activities are not controlled by a common plan and are not subject to a common direction. This defect will not be cured and the commission will not be able to perform in full the duties placed upon it until the Act is so amended that it may employ its own personnel. It is important that this action be taken at an early date. Having waited ten long years for a legislative pronouncement of a government policy respecting the utilization of our huge water power resources, we should not be required to wait another long period of years before means are provided for the execution of that policy.

"There is one other matter to which attention should be directed. There are movements on foot in several quarters to secure for certain sites or streams special legislation, which if approved would constitute a partial repeal of the Federal Water Power Act, and would eventually result in the progressive disintegration of our present national water power policy. If these proposals that rights or authorities be granted independently of the present law be examined, it will be found that some or all of the essential features of the Act, particularly those that protect the public interest, have been omitted, even when provisions in direct conflict have not been substituted. Furthermore, the granting of special privileges to favored interests would clearly discriminate against those who, in the faith that Congress has at last fixed its policy, are investing hundreds of millions of dollars under the obligations of the Act."

Denver League Will Increase Its Activities

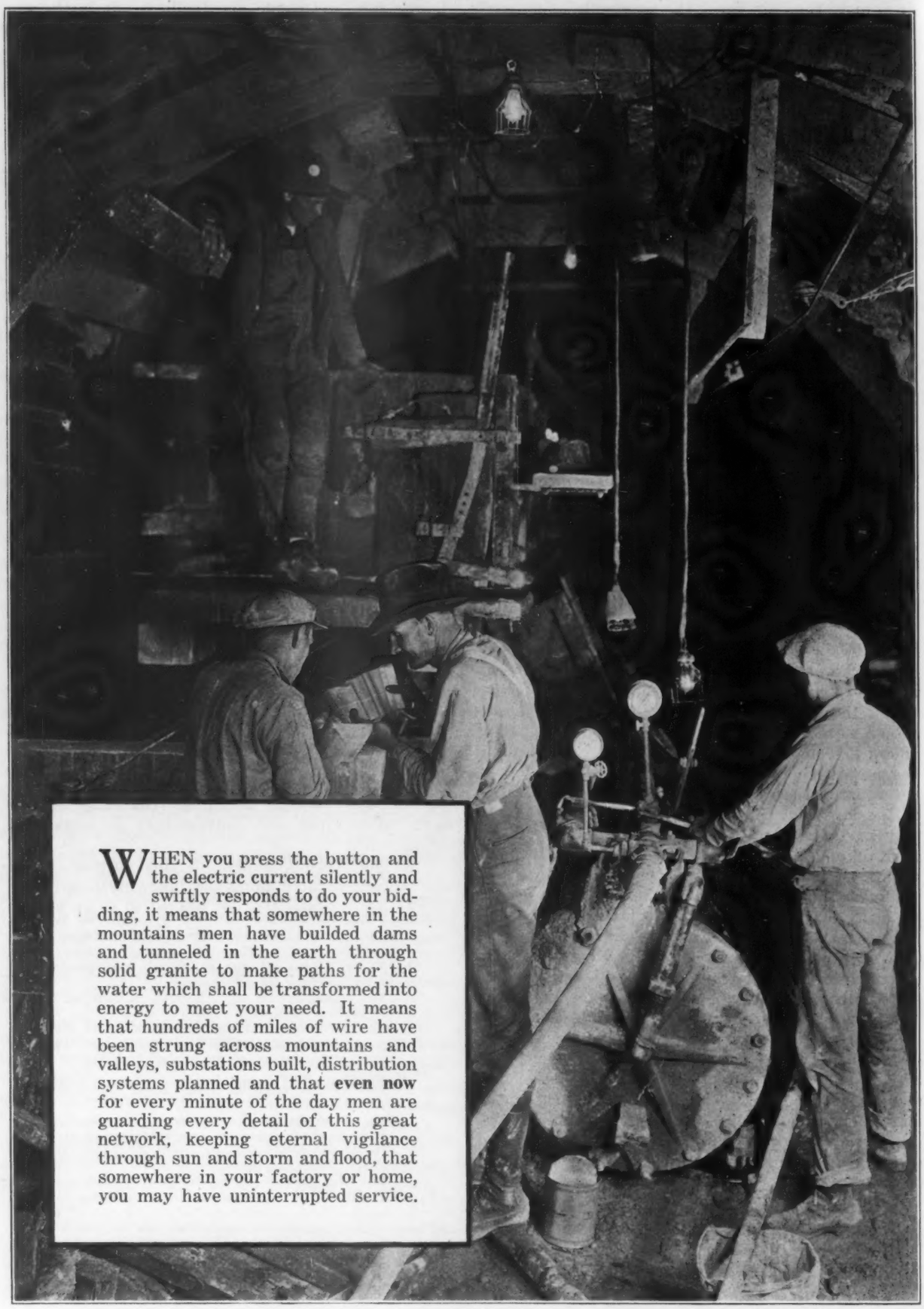
As the result of further study of other and older electrical leagues, the Advisory Board of the Electrical Cooperative League in Denver has revised its plans and activities for the balance of the present fiscal year. In the hope of more clearly defining its purpose and in making its position felt in the community, the board decided to concentrate on a revamped plan of activities, most of them related to the original outline but more specific as to nature in extending the electrical market in Colorado.

This action was taken at the time when Laurence W. Davis of the National Association of Electrical Contractors and Dealers and K. A. McIntyre of the Society for Electrical Development visited in Denver recently, and it is said that the observations and opinions reflected by both of these experts had considerable to do in establishing the broader policies.

According to a report from Denver, the fundamental purpose of the league as a service organization has been recognized. To support and strengthen this position, the league intends to bring to the public better illumination and a more complete utilization of the benefits accruing from the use of electrical servants and conveniences in home and business life.

In the accomplishment of this purpose, effort will be concentrated along the following lines:

1. The enlargement of the league staff by the addition of a field man to work directly with architects, builders, owners and others in advising on complete electrical installations in all types of buildings.
2. To work toward the continual improvement and enforcement of electric wiring rules.
3. The establishment of a permanent lighting exhibit with accompanying lectures.
4. The encouragement and co-ordination of electrical exhibitions at various expositions.
5. The establishment of more electrical homes in the most advantageous places.
6. Serving the public as a bureau of electrical information.
7. The development of team work throughout the industry by get-together meetings and other social activities.
8. The extension of membership in the league to other interests participating in the benefits of its work.
9. The education of the purchaser of electrical service and merchandise to the value of the league emblem to them, viz.: to indicate that anyone entitled to its use is reliable and responsible, and that it represents the highest class of service, workmanship and materials.
10. The extension of the work of the league to such other territory outside of Denver as can be served profitably to the industry.



WHEN you press the button and the electric current silently and swiftly responds to do your bidding, it means that somewhere in the mountains men have builded dams and tunneled in the earth through solid granite to make paths for the water which shall be transformed into energy to meet your need. It means that hundreds of miles of wire have been strung across mountains and valleys, substations built, distribution systems planned and that **even now** for every minute of the day men are guarding every detail of this great network, keeping eternal vigilance through sun and storm and flood, that somewhere in your factory or home, you may have uninterrupted service.

Thirty-five Thousand Public Servants

How Thirty-five Thousand Employees of the Power Companies and of the Merchandising Branches of the Electrical Industry in the West Have Developed the Idea of Helpful Cooperation in Community Service

By Robert Sibley

JAMES H. WISE

Assistant general manager of the Pacific Gas & Electric Company, who lost his life in the performance of his duties on Sept. 16, 1912.

"While in the full flush of youth he passed away—his ambitions unrealized in their fullness, but leaving for those who were associated with him a memory which will endure. He builded better than he knew, for up in the high Sierras there stands a monument to his genius, as everlasting as the granite rocks—He died in the performance of duty—Let there be inscribed to his memory, that he was a loyal friend, faithful to his task."

—A tribute by John A. Britton, Dean of the Electrical Industry in the West.

AS FAR back as 1892—thirty years ago—it was my privilege to observe intimately the enthusiasm, vigor and love for the work of service which has prevailed to such a marked extent among the workers in the electrical industry in the West. From the old San Antonio plant in Southern California (the first long distance hydroelectric plant in America transmitting power at a voltage higher than generated) down to such record achievements as the Caribou development of the Great Western Power Company and the Pit of the Pacific Gas & Electric Company or the Big Creek of the Southern California Edison Company, the record of loyal work, building toward an ideal of service to the public, has been of the same high order.

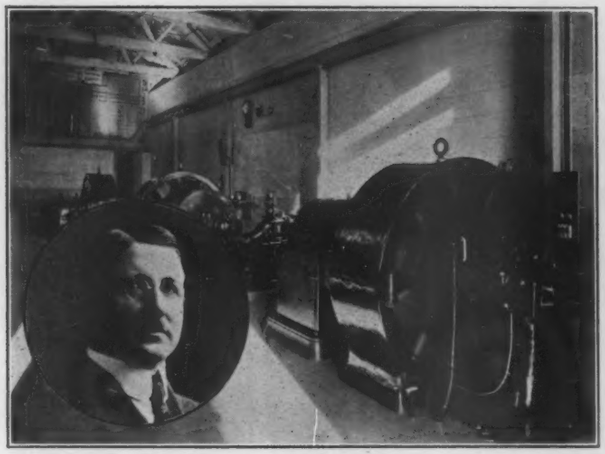
H. G. Wells, in his "Outline of History," places human cooperation and the spirit of social helpfulness as the essence of man's progress and the goal of his somewhat bungling gropings. The praise may be thought perhaps a bit fulsome, but it is nevertheless a sincere statement on the part of the writer, that so far as his observations have extended, there is no industry or no group of workers who so exemplify this ideal of community willingness as the electrical industry in the West.

The electrical workers of this country west of the Rockies have learned the value of the community of interest. They have sensed the importance of being in the true sense citizens of their world and from the remote centers to the great metropolitan areas they will be found in the forefront of civic affairs. They have dared greatly in finding out and following new paths, without fear of precedent, alike in the handling of physical forces and of men. They have searched out new scientific truths for practical application in bettering the affairs of men; they have studied men and conditions to make these truths of the highest economic value. They have kept in great measure clean and clear-cut in their private lives, serving as examples of good citizenship in the communities where they dwell. They have early learned that man is a social being and hence they have endeavored not to rust out socially. They have encouraged the young man in his endeavor to attain to higher planes of mental ability. They have cultivated the ability to get on with men. They have learned the good results to be derived from the application of thoroughness in work. They have learned to obey. They have developed to a marked degree the power to originate new ideas and inventions.

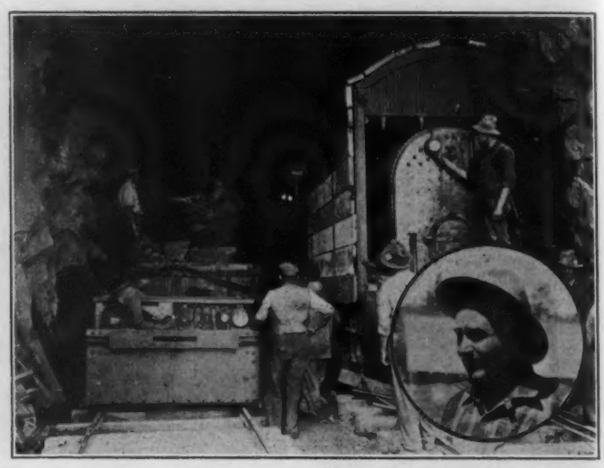
And finally, above all other traits, they have evolved a sense of loyalty to their industry and to their fellow workers which stands out above that of any other single industry or grouping of men to be found in the cross-section of present day effort. This loyalty to an ideal of service has at times cost them their lives—at other times they have been spared to carry on their simple rounds of daily service.

It is not the purpose of the following lines to tell "How did he die?" but rather "How did he live?" Hence, in the few instances we have chosen to illustrate the measure of service which is being rendered by these thirty-five thousand workers of the electrical industry throughout the West, we shall endeavor to give the reader some idea of the intricacies and difficulties encountered in this daily service. And if we prove true picture painters in these few instances following of "what is behind the switch," the reader will bear in mind that this list should be extended to include thirty-five thousand heroes in all.

J. M. Howells, consulting engineer with the Great Western Power Company and originator of the Feather River power development, and Tom Goon, construction camp cook and well known character in western power circles where he has fed, bossed and loyally served a generation of power company men. There are thirty-five thousand like these two and in the wide range of electrical activities between them—all of them working in their respective departments to make actual that swift and dependable service which is represented by the electrical switch in the factory or in the home.



For his ability to develop equipment to control the erratic action of streams in southern California, where every drop of water must be utilized, Gustaf Clingwald is the hero of the operating department. His automatic water control devices, when used in conjunction with electrical protective equipment in the smaller hydroelectric plants, have resulted in a marked decrease in the cost of operation of these Southern California Edison plants. The picture shown is that of a twenty-nine year old pioneer three-phase hydroelectric station which now operates semi-automatically. It is at present generating energy at a lower cost than at any period in the twenty-nine years of its existence.



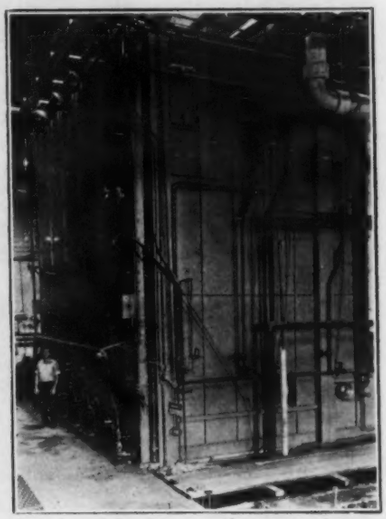
Milton Kempt, in charge of crews on one section of the Florence tunnel of the Southern California Edison Company, typifies the construction worker who is back of electric service. He made a record for tunnel driving on the Big Creek tunnel. It was necessary to bring this tunnel in on time and during the last forty-eight hours, Mr. Kempt slept only two hours. Manifesting a human endurance that was almost beyond comprehension, he led his men on till the drills jammed through the headings, the muckers cleared the passage and the water flowed through, conserving thousands of dollars' worth of oil and making possible enormous increases of hydroelectric generation.

H. N. Nygaard and Chas. Rada of the Pacific Gas & Electric Company, with their service truck. Through three years of experience in the field, these men have worked out most effective methods of boxing and caring for tools, so that both time and money is saved and replacements are reduced to a minimum.

Grant Howard and crew of the San Joaquin Light and Power Corporation, carrying out one of the many operations which go to make up the service back of the service. Following the opening of the Kerckhoff plant, the San Joaquin company made a record by connecting up 5,500 rural customers who were waiting for power within 90 days' time.

James Akin of the Portland Railway Light & Power Company, who has the reputation of having made more taps on live high voltage lines than any man in the company. On one occasion he ran a line of lighting secondaries at night single-handed to a house in the suburbs where a woman lay on a sick bed in a dying condition and made a tap on the hot 2,300-volt primary while drenched to the skin in order to provide light for that sick bed.

Battling the Sierra snows to keep the lights burning—a crew of Pacific Gas & Electric Company men who worked waist deep in snow and water from sunrise until an hour after dark to keep the Drum Canal open during a snow storm. W. J. Crabbe is superintendent of the division, Jack Eddy foreman of canals, and Tom Jesserson ditch foreman. Others on the crew are Miller Jesserson, P. T. Worthly, Tony Fontz and Mike Fontz.

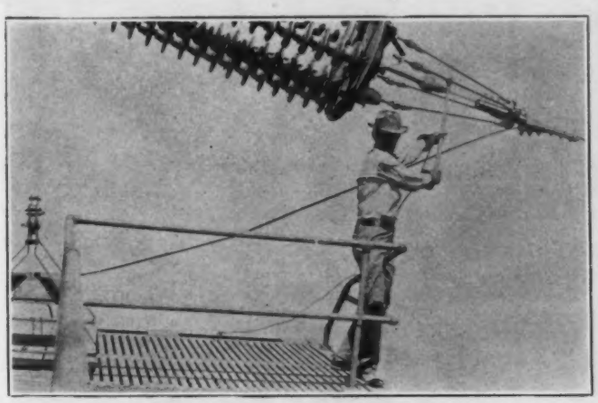


In the steam station as well as in the development of water power, the man always on the job in the plant is the one who best typifies the personal element back of continuous service. The boilers are those of the San Diego Consolidated Gas & Electric Company, the largest west of the Rockies, and the man is A. C. Stuckrath, fireman. Steam auxiliary service plays an important part in supplementing hydroelectric service.

George Yost of the Southern Sierras Power Company, conducting a pack train across the pass below Mt. Lyle to bring cement for the building of the Rush Meadow Dam. Each pack animal carried three packs, or 300 lb. of cement, over a trail which reached an elevation of 11,000 ft. This is typical of physical difficulties overcome in carrying out some of the hydroelectric construction work in the mountains and isolated parts of the West.

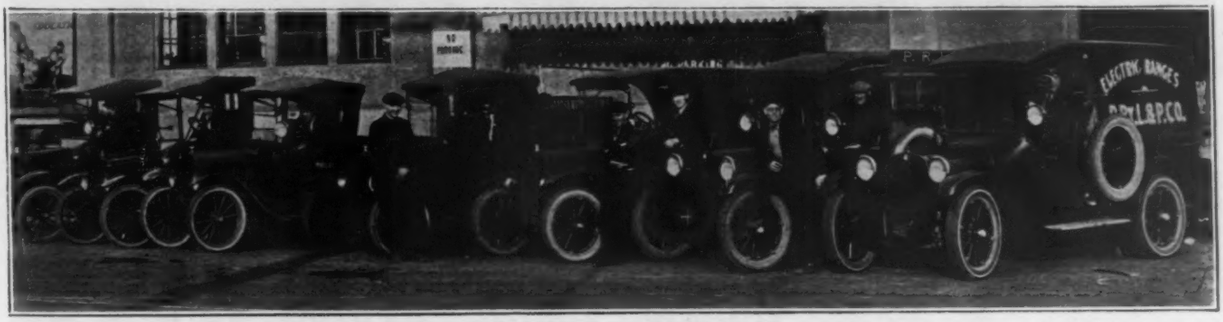
Nick Arff of the meter department of the Portland Railway Light and Power Company, tagging a meter on a recently vacated house. For the convenience of the new tenants, the company arranges to leave power on for five days' time and leaves a note to this effect on the meter, thus giving the householder time to get settled without the inconvenience of having an interval of no power. It is these small courtesies which mean most in power company service.

In extreme emergencies, an electric range may be delivered on foot. B. M. Pharris of the Line Department of the Portland Railway Light and Power Company who is carrying the range, weighs two hundred and sixty pounds and is six feet, six inches in height, while his helper, Oliver Howie, weighs one hundred and thirty and is five feet tall. Western power companies have repeatedly demonstrated their ability to meet emergencies.



C. E. Hall of the Great Western Power Company exemplifies the heroism and loyalty in the line of service of which so much is found in the rank and file of the power company employees. In September, 1920, he rescued a fellow worker who was shocked while testing insulators on a 100,000-volt line. Hall had to wade through a considerable pool of water to reach the tower on which the victim had been working. Realizing the necessity for prompt action, he and another lineman administered the Schaefer-Prone resuscitation treatment while on the tower under the most difficult and dangerous conditions, restoring respiration in about fifteen minutes. The man has since recovered. Photograph by M. A. Ayers.

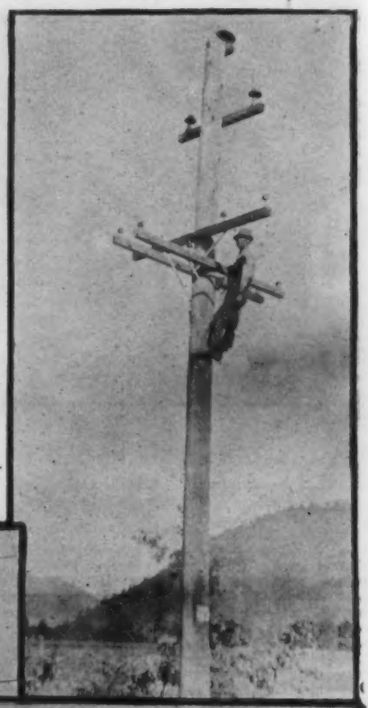
Day and night the service department of the power company stands ready to answer trouble calls and to keep the lines in perfect working order. It is in a way the visible agency through which the service of the power company touches the public. The battery of telephones used in this service is composed of two exchange lines, one main line for the private use of the service men calling for orders, one main line to the police station and two local private lines, also used for dispatching inter-department business. J. P. Fenerstein, the dispatcher, is one of three men who handle the service work during each twenty-four hour period and who at all times keep their heads, even when an unreasonable customer calls up.

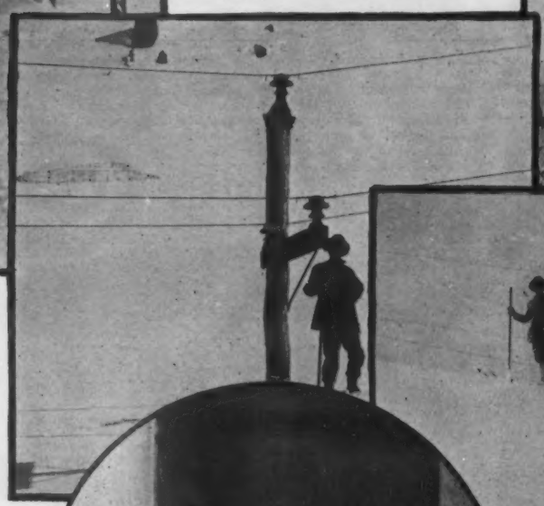


These service cars of the Portland Railway Light and Power Company furnish continuous service day and night to the trouble complaints of the 60,000 customers and are operated on two shifts, of eight hours each, each day. The cars average eighty miles daily over a territory of one hundred square miles. The service men from left to right are: W. G. Zurbuchen, A. L. Ellis, J. Drennan, R. C. Blackmar, H. A. Sargent, H. G. Wilson, M. S. Potter, E. E. Landis, E. L. Faust, F. O'Donnell, R. H. Johnson, R. B. McClurg.

Standing on the pole to the right is George M. Stidham of the California Oregon Power Company, who risked his life in attempting to rescue a companion who was electrocuted while working on a high tension pole. Failing to remove the body from below by pulling on the clothing he cut the wires, thus clearing the circuit, and worked incessantly with the usual resuscitation methods until relieved by doctors and outside help.

Winter conditions in the mountains must be met. Fighting through the snow to make repairs on service lines after a heavy storm—California Oregon Power Company at Dunsmuir, California. (Left.)





On the snow in the center picture patrolling the Western Colorado Power Company's 17,000-volt line near the top of the range. The picture shows the severe conditions under which service is maintained. Snow at this point is twenty feet deep.

The pole in the picture at the right-center of this page is 35 feet high and the snow almost as deep. C. G. Brudlove and helper of the Idaho Power Company are making sure that the lines are in good condition and that there will be no interruption to service.

In every part of the West, the men of the electrical industry, from power company, manufacturer, distribution house and retailer, are banded together in statewide leagues whose watchword is "Better Service." The view is that of a "Get-together dinner" of the California Electrical Cooperative Campaign at the Palace Hotel. The ultimate expression of the service of electricity is in its use in the home and the factory, as shown in the insert.

Recognizing that one of their functions of service is to place the expert knowledge of the electrical industry at the disposal of the housewife, the local electrical clubs in all parts of the West have fostered "Electrical Homes" and exhibits. E. O. Shreve, president of the San Francisco Electrical Development League and R. M. Alvord, of the California Electrical Cooperative Campaign, are shown standing on the steps.

Headquarters of the mountain construction end of the program, upon which the Southern California Edison Company is spending two million dollars a month in building for the future—driving a tunnel through the mountains and laying the foundation work for power development which will meet the needs of the district which it serves in 1930. Not the least of the services which the power company renders is the pioneering work which it does in building beyond the wants of the present in anticipation of the increased demands of the next generation.

Do the Power Companies Give Adequate Service?

THE answer to the question of whether the western power companies have given adequate service in the past and whether they may reasonably be expected to in the future lies in that economic principle underlying the operation of business enterprise which offers the incentive of increased rewards for increased service. Like any other private enterprise, the power company faces the situation of profiting as it increases its business and increasing its business only as it is able to furnish a better and cheaper product.

This relationship between increased service and any extension of profits is the closer because, under commission regulation, there can be no increase in the margin between cost of production and rates to the consumer. The soap manufacturer may increase his gains in two ways, by increasing his market and by lowering his cost of production while he still charges the same for his product, but every improvement in the manufacture of electricity is passed on immediately to the consumer through lower rates fixed by the regulating commission, and rewards come only through the greater volume of business resulting.

There is nothing Utopian in the situation—all private enterprise is dependent in the last analysis upon the good will of the public. The spur to individual ambition which is provided by the lash of this necessity for rendering service in proportion to the reward which it is desired to reap is the fundamental justification for private operation. In a very selfish and businesslike world it is comforting thought for progress that it pays to be good.

ON a conservative estimate, over fifteen billion dollars will be spent in the West within the next ten years. One and one-half billion of it will be spent in the construction of homes — homes which will be electrically lighted and electrically served, which will be built only because the districts, in which they will be located, will be made more livable and attractive by adequate transportation facilities (electrically operated), electric street lighting and the protection and convenience of the electric telephone. One billion of it will be spent in the erection of factories —factories which will be electrically lighted throughout and which for the most part will be built entirely without chimneys because electric power will have taken the place of the steam engine and the boiler. One and one-half billion of it will be spent on the farm, most of it in the development of land made arable only through the use of electrically operated pumps. Without going further into the part which electricity has come to play in every function of western life, it is at once apparent that an adequate supply of electric power at reasonable rates must be available if this predicted progress of the West is to materialize as anticipated.

With electric service recognized as an essential in western development in the same sense as are transportation facilities or a supply of fresh water, the public has the right to inquire not only, if the electric service now offered is adequate, reliable and cheap, but also if it will be equally adequate and still more reliable and cheap to meet the increased demands of ten years from now. In other words, in this industry of furnishing "service," can the western power companies be expected to work in the

interests of the public, building ahead to meet needs as they are foreseen, searching for new and better ways which will be ultimately reflected in better and cheaper power? Have the power companies given adequate service in the past and may they reasonably be expected to do so in the future?

In spite of the fact that the millennium has not come in any field of business and that the power companies, along with every other human institution, may be charged with some defects of service, the answer should be unhesitatingly in the affirmative. In fact, it may fairly be said that in many respects the West enjoys the most advanced power service of any district in the world. This is an easy statement to make, but there is supporting evidence to justify it. The West uses more power per individual than any other section of the country and in spite of unusual difficulties of engineering involved in western power developments, it pays less for the electricity it uses than does any other district. Since the United States is advanced in ways electrical beyond the remainder of the world, this places the West in a most satisfying position.

Per Capita Consumption and Charges

The figures are as follows:

Kilowatt-hours Consumed Per Inhabitant

In the 11 Western States	895
In the remainder of the United States	372

In other words, electricity is three times as important in the life of the average westerner as it is to the citizen in any other section of the country.

Charge to Consumer Per Kw-hr. Generated

In the 11 Western States	1.57c.
In the New England States	2.82c.
In the Atlantic States	2.09c.
In the South Central States	2.65c.
In the North Central States	1.82c.
In the United States as a whole	2.17c.

These figures are based upon data furnished by the U. S. Geological Survey and convey a fair idea of the relationship in rates existing in the various sections. The West, in other words, enjoys a rate which is 14 per cent less than the next lowest rate, 57 per cent of the rates charged on the average in the New England states and 73 per cent of the average rates for the United States as a whole.

Decline in Cost of Electricity

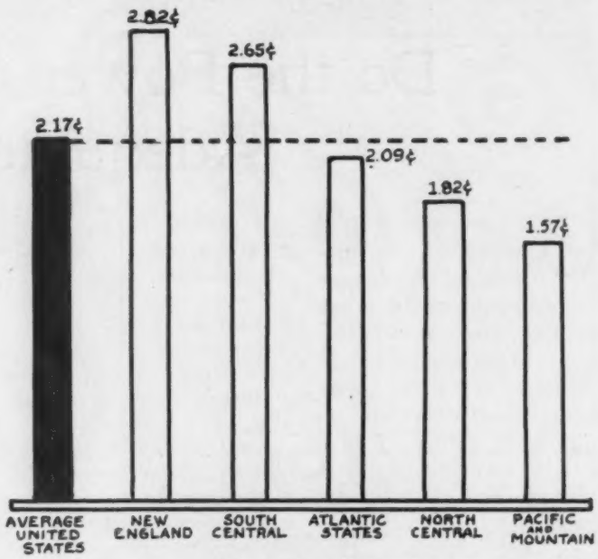
There are a few products whose cost has not materially increased in the past twenty years. Electricity is one of the few. The electrical industry from 1902 to the end of 1917 reduced the price of electric energy to one-half what it was in 1902. From 1917 to 1920 there were some very slight increases, followed by reductions within the past two years, and the average cost of electric energy on western power company lines in 1922 is less than one-half of what it was twenty years ago. The output of electricity is about four times more per employee on western power company systems than it was in 1900, both facts testifying to the progressive attitude of power company management and to the ability of power company engineers.

In attempting to answer the question as to whether electric service has been adequate to meet the needs of this district in the past, it is illuminating to look at the records of western growth. Any student of western development is familiar with the remarkable strides of this territory revealed by the returns of the U. S. Census. The following table is an indication of the fact that western growth has not in any way been retarded during the past twenty years:

Percentage Increase, 1920 Over 1900

	11 Western States	United States
Population	117	39
Assessed Value, all Property	378	167
Annual Bank Clearings	1,149	428
Value of Annual Farm Crops	274	204
Kw-hr. of Electricity Generated	2,177	2,097

One of the best tests of the economical methods of operation and satisfactory manufacturing conditions back of any product is the increased use of the product by the general public. The fact that matches have advanced from the stage of an expensive and curious luxury to the ordinary commonplace of every household, testifies to the healthy fact that scientific advances and improved conditions of manufacture have been introduced in the match making industry. The same situation prevails in the case of electricity. In 1902, the average inhabitant of the 11 western states used 75 kw-hr. of electric power. By 1912 he was using 450 kw-hr. and by 1920 895 kw-hr. The latest statistics indicate the figure of 1,221 kw-hr. per capita for the 11 western states for 1922. The service is evidently reasonably satisfactory.



Comparative rates per kw-hr. generated, based on U. S. Geological Survey records for the first ten months of 1922. In spite of the difficulties in the generation of power which western power companies have had to meet, rates to western consumers are appreciably lower than those of any other section of the United States.

Supply of Power versus Demand

Have the power companies always had sufficient power to meet the demands made upon them? This question is generally asked with the year of the power shortage in mind, when certain of the Cali-

Scene at the Jordan hydroelectric plant of the Southern Sierras Power Company, after a disastrous snowslide of March, 1911, in which seven persons were killed by the tons of snow which buried the power house. The interruption to the service was noted at division headquarters and the superintendent of the plant started out in a blinding snow storm to cover the 14 miles that the service which had been crippled by the elements might be restored.

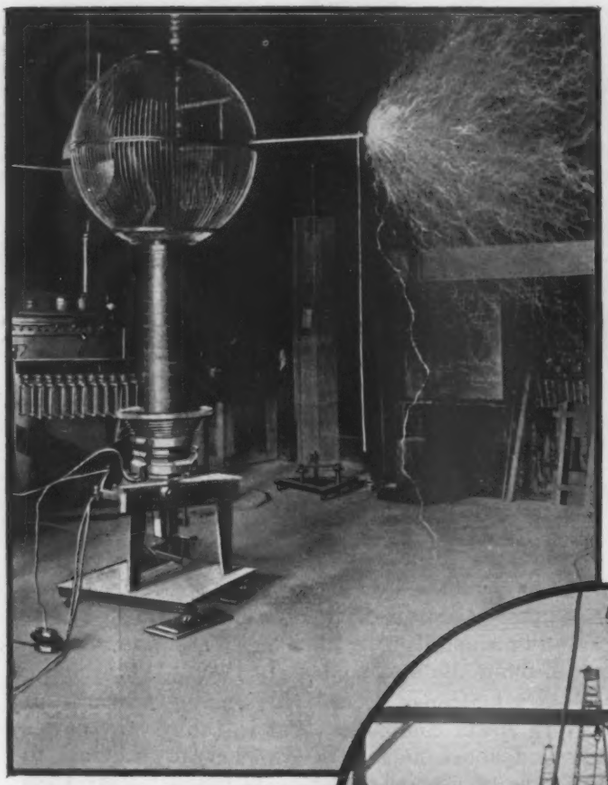
fornia power companies were forced to discriminate between their consumers, and the "power administrator" was appointed at the request of the companies to safeguard the interests of the essential industries of the state. It is important to understand the conditions under which this shortage of power occurred. All power companies plan their construction work at least ten years ahead, with the idea of having power available as it is needed. In 1917 the War Finance Board stopped all progress on construction plans. Money was required for more urgent purposes and the power companies, who had maintained a generous surplus of power over demands, could worry along and approach nearer the margin of their capacity without danger or inconvenience to the public. This was all very well, except, of course, that when the war ended, a sudden spurt of ship building and industrial development of the boom period made an unusual demand for power and brought this margin somewhat closer than was anticipated. Coupled with this rather abnormal situation came three dry years in California when the rainfall was far below normal and when some of the water power plants operated on stream flow were unable to live up to their full capacities. During one year there were hours at the time of peak loads when there was not a kilowatt to be spared on any of the interconnected systems of California and when the power companies had to refuse to take on new customers because they could not guarantee service during a rush period.

All this should be looked upon as a war time aftermath, however, and not in any way characteristic of general power conditions. The major effect of the interlude was to teach the farmers and the industrial men of California the importance of electricity and the need for financing the power industry as a factor in the advancement of the state. Coupled with the story of the California power shortage should go also the typical record of one Northwestern power company which has a steam plant on its lines ready at all times for standby service, to take up a share of the load in case the operation of the water power plants of its system should be interrupted or should prove inadequate. It has not had to call upon the steam plant in twenty years.

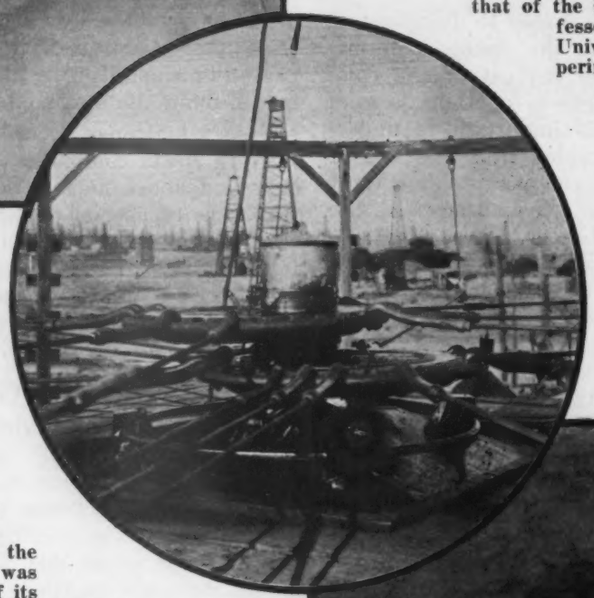
As a matter of record, the standby provision of western power companies, that is, the reserve power over and above normal needs, held in readiness to take care of special demands, is much higher than similar provisions made elsewhere. As a matter of fact, the peak load—which is the greatest demand for electric power made upon the power company at any one time—is seldom more than 80 per cent of the capacity of the plants.

Construction Plans to Meet Future Demands

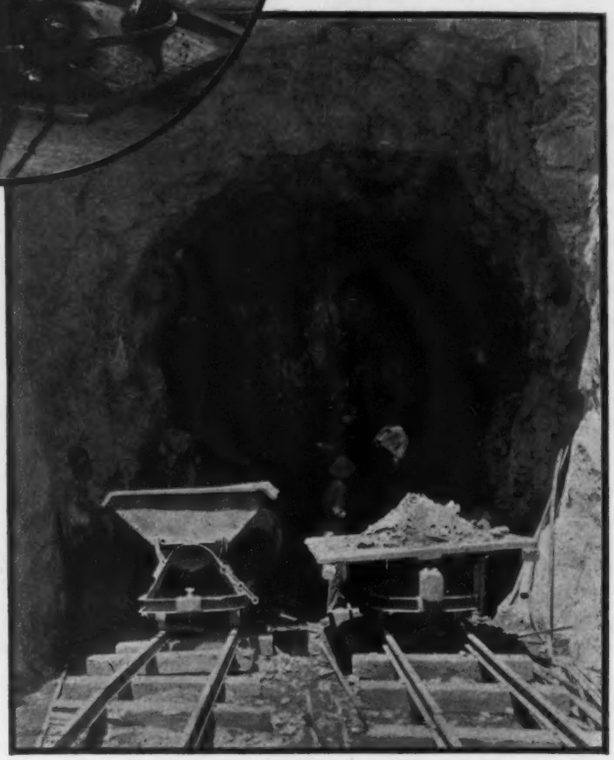
Will the public service industry be prepared to give adequate service for the increased needs of the future? It is only necessary to turn to the programs as laid out by the power companies and now under construction. The method used by practically all power companies in this district is to plot the curve of the demands on their systems over a period of some years and then to project this steady increase into the future, laying out a construction plan which will permit of a generous margin of surplus power over and above this demand at all times. As special conditions arise which would tend to modify this plan, construction is advanced or retarded to meet the situation. A questionnaire sent to power companies furnishing 95 per cent of the power used west of the Rocky Mountains, a little over a year ago, indicated that this program called for the addition of 2,850,000 hp. to the systems of these companies within a ten-year period. At that time the total capacity of all power plants in the West was 2,515,000 hp., which, as may be seen, allows for quite a healthy growth—more than doubling the capacity in a decade. During the first year, 1921, nearly one-sixth of this program was actually carried out and 287,129 hp. additional in new plants has been completed during 1922 or is now under construction. In California each one of the major power systems has added one

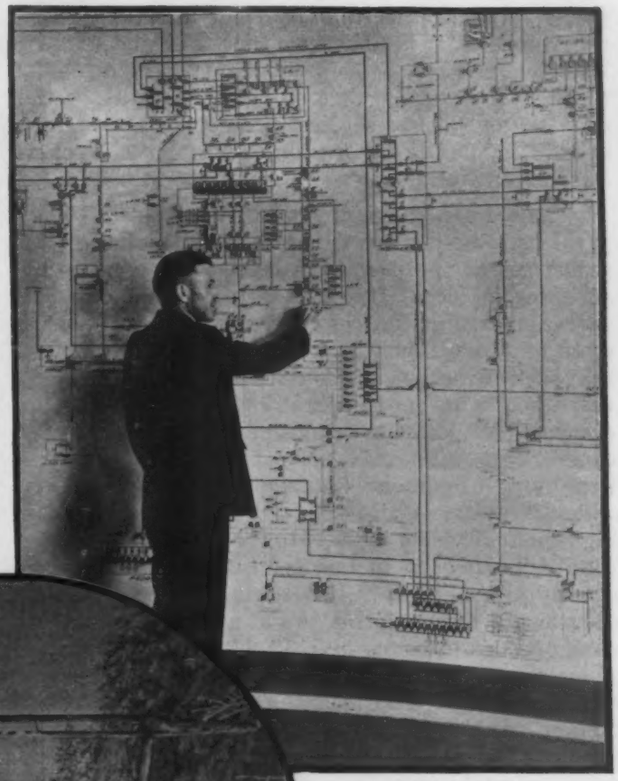


IT is difficult to visualize the tremendous efforts and the detailed processes which are back of the power as it is delivered to the customer's home. Among the great engineering feats which have made possible the bringing of power from the mountains to the cities, under conditions which seemed to offer insuperable obstacles, may be listed the longest distance transmission of power in the world, 832 miles across the desert on the system of the Southern Sierras Power Company, the world's largest high head impulse turbine in the Caribou plant of the Great Western Power Company, the largest high head reaction turbine in the world in the Kern No. 3 plant of the Southern California Edison Company, the present record for high voltage transmission held by the Great Western Power Company at 165,000 volts and the contemplated transmission at 220,000 volts by the Pacific Gas & Electric Company and the Southern California Edison Company, not to mention the extent of interconnected systems which now reaches from near the Washington border to Mexico—a far greater area, involving power at higher voltages than any contemplated in the superpower zone of the Northeast. All these things have made possible the generation of electric energy under western conditions and its transmission to distant market centers at the most economical figure possible, permitting the low rates for which this region also holds the record. The picture shown is that of the high tension laboratory of Professor Harris J. Ryan at Stanford University where thousands of experiments have been performed in cooperation with power company engineers, designed to test the properties of insulators under high electric stress. This is but one angle of the problem whose solution has economical methods of high voltage transmission — and made possible the use of but one phase of the research work continually going on in the interests of efficient operation and ultimately lower rates to the consumer.



NOT only in the development of improvements in the line of providing electric service at lower cost, but in the research work which goes toward the bettering of conditions in industry, does the power company function. The oil fields of California today are pumped by electricity, a unique tribute to the supreme economies of electric service, not only reducing costs of oil and oil products for the state, but also helping to conserve oil. That the motor adaptable to this service was worked out and the conditions of its application made possible must be credited to the foresight and indefatigable persistence of a western central station manager, who saw in this development, not only a profitable field for his company, but a service to western industry. The field of industrial heating offers numerous similar examples of industrial problems solved by power company initiative to the benefit of all concerned. The problem of power generation in the West is the problem of water power development. With but eight and a half per cent of the population of the United States, the area west of the Rockies has seventy per cent of the potential water power of the nation, and twenty per cent of the electricity generated by water power in the United States last year was generated in the one western state of California. The water powers of the West, however, although abundant, are most of them located at great distances from the markets for power, in many cases in mountain fastnesses which it has required the construction of railways and highways to reach. An example of the efficiency of construction which has made possible the bringing of electric service from distant sources at the cheapest rates to the consumer is the Kerckhoff plant of the San Joaquin Light & Power Corporation which was put through in record time, in spite of water encountered in the rock and unfavorable weather conditions, the power being thrown upon the line sixty days ahead of schedule.





IN the load dispatcher's office of the Southern California Edison Company. As a consequence of the importance laid upon uninterrupted "service," the very watchword of the industry devoted to the generation and distribution of electricity has come to be summed up in that word. Through a tremendously intricate organization of machinery and man power, the myriad spider web lines throughout the country are kept charged with "service" always on tap at any hour of the day or night, ready to light a sick room or to keep turning the wheels of a great factory without a pause. This means incessant vigilance in every department—it means occasionally acts of great heroism in performing a service in the face of difficulties. Not the least interesting of the departments of the power company illustrative of the coordinated team work which goes to make up the servant, electricity, is the office of the load dispatcher. Here a diagram of the entire system is laid out before the eyes of this one man, who is in constant touch with every factor in the situation. If for any reason a power line should be struck by lightning, or a water wheel suddenly go out of commission, he is instantly apprised of that fact and uses all the resources of the system to prevent a breakdown of any department. Power is turned in to the crippled division from other plants, or the resources of other power companies, interconnected to serve just such an emergency, are called upon. At the time of a great natural disaster, such as an earthquake or flood, or even at the time of a quieter crisis when some extraordinary demand for power taxes the resources of the system, this office is a busy place. The interconnected system in which this dipatcher functions handled 4,300,000,000 kw-hr. over its lines in 1921, a block of power greater than that of any other interconnected system in the world. It is evident from this that the load dispatcher is rightfully called the nerve center of the power company system. "Service" starts from his office.

PATROLMEN are kept constantly on guard to warn of any breakdown along the thousands of miles of power company lines. In the case of any disaster, no difficulty is too great to be undergone to reinstate service promptly. A group of the California Oregon Power Company's "trouble shooters" are here seen repairing a double pole line which broke down under the effects of an unusually heavy snow storm. What miracles can be performed in such a cause may be seen by the record of the recent Pueblo flood, during which miles of transmission line were wiped completely out and the power house itself was flooded and almost buried in mud. By day and night work, emergency service was ready within twenty-four hours following the recession of the waters and power company service was one of the most important agencies in bringing order out of chaos in the remainder of the district. The power plant itself was completely reinstated within a ten-day period. The San Francisco earthquake offered similar examples of heroic efforts in the name of service. More recent is the Portland snow storm in the fall of 1921, which destroyed a section of the Columbia Highway and brought down miles of wires under the heavy burden of snow. At that time the entire force of the power company, from president to office boy, who could be spared from the operation of the system, turned in and worked for 36 hours without food or rest until the lines were again in working order. One of the most visible forms of the service performed by the power company is represented by the service wagon—ready at all times to respond to trouble calls, whether it be a line down, a customer's fuse which has given out and placed a home in darkness or a range which needs a replaced element. Recognizing that the commodity which it is selling, is "service," the power company stands prepared always to keep that service at par.

or more plants to its capacity and there is now a power surplus rather than shortage in every part of the state. This healthy condition will undoubtedly lead to the development of new markets, alike through the working out of new apparatus or the adapting of electric service to meet new conditions in industry and the extension of power use through attractive rates.

Possibilities of Rate Reductions

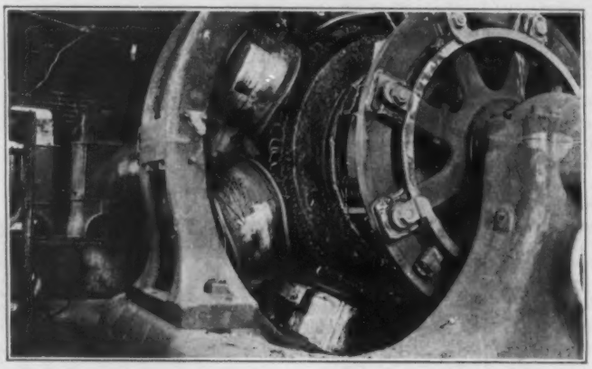
It has been pointed out that most of the rate reductions of the past have been made possible by advances in technical design or other economies of operation within the company which have reduced costs of production. There is no reason to expect that such advancement has ceased. There is, in fact, now under way experimental and research work in every field of power generation and distribution. An experimental high voltage line is now under operation by the Southern California Edison Company, which company is also supporting a laboratory for high voltage phenomena at the California Institute of Technology in Pasadena, similar to the one already in operation at Stanford University. The program of discussion at the annual convention of such organizations as the Pacific Coast Electrical Association, the Northwest Light and Power Association and the Rocky Mountain Division of the National Electric Light Association, is a record of studies made by individual companies to improve apparatus or conditions.

The Power of State Utility Commissions

The role of the state utility commissions is to safeguard the public interest in all this and to insure the provision of adequate service at reasonable rates. Few individuals appreciate what sweeping powers are thus vested in the state. The utility commissions of the respective states determine what bond and stock issues shall be allowed the utilities within their jurisdiction and what rates of interest shall be paid. They examine all expenditures made and determine whether the power company should be allowed to recover for them in the rates charged, specifying the methods by which accounts shall be kept; they evaluate the property at what they determine it actually to be worth and fix rates upon this actual unwatered investment, allowing something like an eight per cent return to care for the expenses of operation and the cost of money. If the service in any community is adjudged unsatisfactory, they have the power to insist that the power company in question shall provide satisfactory service or, as a final resort, to allow another company to enter the field which will give the service required. The utility commissions in the past have actually done all these things.

Forced Reduction of Expenses

There have been cases where they looked over power company books and judging the salaries of certain officials to be higher than necessary, have refused to allow for this expense—and others where they have refused rates which the power company had proved were necessary to cover expenses, holding that expenses were beyond reason. Whenever a period of national inflation causes the increase of costs and higher rates are allowed, the commissions became immediately unpopular. The spectacle of an Oregon commissioner recently recalled, because he voted for a higher rate, and the investigating committee of the state legislature which last year examined into the methods of the California Railroad Commission, are examples of such popular injustices. It is only fair to state that the California investigating committee, which started out with an acknowledged hostile attitude toward the commission, concluded with a report in its favor, justifying its methods of rate fixing and urging that more power be put into its hands. It must be remembered that during the post war period when the prices of all commodities soared and increased on an average from 40 to 250% over 1913 prices, power rates the nation over, did not increase more than 15%. Practically every power system of the West has recorded rate decreases within the past six months and at the present time, rates in this section of the country are actually lower than they were ten years ago.



When a cat formed a connecting link between the terminals of one of the 11,000-volt oil switches at the Northern Hill substation of the Portland Railway Light & Power Company a serious fire occurred in the early hours of the morning, damaging this rotary converter, transformers and arc-sets and other equipment. Service to consumers and street lighting service was restored by the company within 12 hours after the fire.

Western utility commissions in the past have attracted a very high calibre of man and their decisions have ranked as among the most far-sighted and progressive of any such judicial bodies throughout the country. It is to their credit that they have recognized it as their function to be just and have adjudged it to be to the best public interest to allow the power companies, when giving good service, to make a fair profit—a term which may be defined as a return sufficient to attract new capital for the necessary expansion of power company systems. Such of the public as recognize the absurdity of distrusting the utility commission, whenever the decisions happen to result in higher rates, are fully aware of the importance of these bodies in guaranteeing adequate and reasonable power service for the future, and for the remedy of such faults of service as still exist, count upon strengthening their hands still further. In the utility commissions of the West lies the best answer to the question, "Can and will the West be satisfactorily supplied with electric power?"

Service—the Electrical Manufacturer's Point of View

WEBSTER has recognized the word service to the extent of giving it eighteen separate and distinct meanings. To the electrical manufacturer it has but one meaning—the essence of his business—the production of standard equipment improved to keep up with the needs of industry, placed on the market at as reasonable a price as possible, effectively merchandised and backed up by an absolute guarantee. The many ramifications of this general definition constitute an advantage to the consumer of electrical equipment, machinery, appliances and supplies, which places the electrical manufacturer far to the fore among the ranks of those charged with supplying the public with a manufactured article or commodity.

The West, because of its geographical position with relation to the eastern manufacturing centers, its diversity of natural resources and its abundance of cheap hydroelectric power, is in a position to better realize the importance of the service which the electrical manufacturer offers.

Briefly, the service which the electrical manufacturer stands ready to furnish to the electrical industry, to industry in general and to the public divides itself into four different classes, factory service, field service, merchandising service and publicity service. From the standpoint of the consumer of electrical goods, the first two are the most important; from the standpoint of the distributor, the last two. Irrespective of the relative importance of its various phases, it suffices that the service of the electrical manufacturer stands out unique in the annals of better business.

Manufacturers Endeavor to Aid Industry

In few fields have the efforts been greater to extend the usefulness of machinery and to broaden its applications to industry, than those exhibited by the electrical manufacturer. To this end, elaborate research laboratories are maintained at the home factories, and trained corps of experts are constantly studying the problems of industry to perfect equipment which will do the required work more economically and with more profit. The development of the natural resources of the West has furnished some typical examples of this phase of the electrical manufacturers' service. Motors and equipment have been perfected which reduce the cost of oil well pumping by almost half, in addition to performing more efficiently than any machinery which had hitherto been engaged in this operation. Electricity has been applied to logging with excellent results. Vast fortunes in gold, buried in the gravel of old river beds, have been recovered as the result of the perfection of the electric dredge. The large electrical manufacturers maintain engineers whose duty it is to investigate and study the problems of individual industries. Engineering organizations are perfected for each of many industries. Countless new developments have resulted from the work of these men, and in each case, the results obtained have been passed on to the public.

This is a phase of factory service which has been in vogue for such a long period of time that it has come to be expected. Even at the present moment tests are being made in the iron ore producing sections of the Intermountain district with electric furnaces for the cheaper production of steel.

The Field Service of Manufacturers

It is the field service conducted by the manufacturer with which the West is perhaps most familiar. Geographical location, with respect to eastern manufacturing centers, has tended to develop a field

Stock valued at $1,000,000 is carried in this warehouse so that orders may be filled in 24 hours' time. This is but one feature of the unique service which the electrical manufacturer offers to the West.

organization with western offices comparable to the organizations maintained by the home factories. Offices have been established in western business centers, warehouses erected and special facilities provided for handling repairs and servicing equipment. Trained engineers stand ready to aid industrial plants in choosing and installing equipment. Every facility is maintained for supplying the needs of a trade located thousands of miles from the manufacturing centers.

An idea of the steps which have been taken by the manufacturers to provide service for the eleven western states can be gained from a description of the activities of one representative concern. Branch offices are maintained in five western cities with Pacific Coast headquarters in San Francisco. In that

city alone the company has an organization of approximately 300 people, a warehouse with 150,000 sq. ft. of storage space and a shop capable of handling any type of repair work on the company's products. In addition it maintains an instrument standardization laboratory, one of two in the West. In order to assure prompt shipments of goods, a stock of over $1,000,000 is carried in its warehouse. Orders are filled from stock in 24 hours. The company also includes in its organization a crew of construction foremen whose duty it is to supervise installations of machinery of various types.

So important has electricity become in the growth and development of the West that several of the large eastern manufacturers have found it necessary to establish branch factories in western cities so as to better serve this section of the country. Numerous typical western factories, which are constantly growing and expanding, have also sprung up.

Service from the point of view of the manufacturer entails more than the delivery of goods. Organizations have been perfected for repairing equipment under extraordinary conditions. This is one of the shops maintained for the repair of all types of the equipment.

The Merchandising Service Performed

It is the merchandising service performed by the manufacturer with which the electrical industry is most familiar. As trained engineers are maintained to serve industry, so are trained merchandising experts held ready to aid the electrical dealer and jobber in solving his problems. These men are ready at all times to give advice to the dealer regarding the better conduct of his business. Publications designed to furnish information regarding the latest developments in merchandising electrical supplies and appliances are issued from the factories. Advertising copy is prepared and electrotypes of such advertisements are furnished. Suggestions for window displays are worked out and material for arranging the displays prepared. Educational campaigns are developed and experts placed in the field to help the dealer to increase his sales.

As a part of this service manufacturers have also established stations where the dealer may send appliances for repairs. These "service" stations are centrally located and equipped so as to make any class of repairs on appliances in the shortest possible time. Thus the dealer is enabled to send material to these stations for repair at a minimum cost to the customer.

Building of Good Will for the Industry

The manufacturer plays an important part in the building up of the electrical industry in general, a voluntary service which involves the electrical good-will story. National advertising campaigns emphasizing the usefulness of electricity is one method employed. More recently manufacturers have utilized the motion picture for carrying the electrical message into millions of homes. While such films may concern the manufacturer's product, they are primarily designed for stressing the electrical story and are decidedly popular. For proof, witness the record of the film which deals with the history of light, at the same time tracing the development of the Mazda lamp.

Among the heaviest subscribers to the various cooperative agencies within the electrical industry are the manufacturers, which is but another evidence of the service performed by them. They are ever willing to assume their share of the task of bettering the industry in general and giving publicity to the electrical story.

Taken by and large, every act of the electrical manufacturer, every effort to better his own business and business in general, involves service. Volumes could be written about individual cases which demonstrate the elements which make up this service. Nothing has been said of the financial aid which he extends to soundly organized dealers, itself a great service; nor of the steps taken to expedite shipments or complete emergency repairs.

Taken compositely, these many individual instances prove that the electrical manufacturer practises the theory of "commerce with a conscience," that his is a business based on service,—service that means first, a product designed and intended to increase the store of human comfort and happiness; second, honestly made as to quality and workmanship; and, third, offered at a price that is admittedly fair to both seller and buyer.

Distance from eastern manufacturing centers necessitates an elaborate organization of offices, warehouses and shops in order that the electrical manufacturer may efficiently serve his western customers.

The sales force of a jobbing house is the connecting link between the manufacturer and the dealer and contractor. The sales department of which that of the Illinois Electric Company of Los Angeles, depicted above is a typical example, is one of the greatest educational forces in the industry.

The Electrical Jobber's Service

THE essential problem of distribution is to bring producers and consumers in as close business contact as possible, and thus diminish the cost to the consumer by removing the expensive operation of having the goods pass through the hands of the middleman. The orthodox distribution system consists of two middlemen—the wholesaler and the retailer. Efforts to eliminate the middleman have in a large measure failed, because the stubborn fact remains that the prevailing system perseveres because, like trial by jury—admittedly a faulty legal procedure of law—no better way has yet been found.

The wholesaler in the electrical business, the jobber, continues to grow and more firmly establish himself because he is an economic necessity, a needed cog in the machinery of distribution. The jobber buys in large quantities, and in wide variety, generally from many manufacturers, assembles these stocks, stores them for seasonal demands, oftentimes sorts and repacks the goods and then finds his customers and supplies them with suitable quantities at suitable times. He is in addition a great accounting and credit agency in the industry.

Jobber Exemplifies "Service"

The jobber is engaged in giving daily demonstrations to his customers—the retailers, contractors and power companies—by means of prompt shipments, by large and well chosen assortments, by the employment of good salesmen and well-compiled catalogs and by persistent advertising, that he is the exemplification of "service." To cite an example: The average electrical dealer has a stock of goods made up of several thousand articles, very few of which he buys in any quantity. He finds that he needs a dozen items each made by a different manufacturer, and none of these items in sufficient quantity to make enough weight for a freight shipment, and it is much too expensive to have them come by express. Moreover, the manufacturers of these needed articles are all distant—all the way from the Middle West to New England. The delay is too long to be considered, and moreover none of the manufacturers could afford to sell the retailer such small orders, as their credit and selling forces are necessarily constructed on the plan of selling large quantities of goods to comparatively few merchants. So the retailer finds that the most economical thing he can do is to send an order for the entire list of goods to the jobber with whom he trades and who carries all the items in stock ready for prompt shipment.

Stabilizing the Industry

To the manufacturer the jobber represents another kind of "service." He performs the service of distributing at a cost lower than the manufacturer and he carries slow moving stocks covering new lines for which he is engaged in building a future demand. The jobber's contracts with the manufacturer extend over a long period of time and are on established terms. His financial stability and the size of his orders permit the manufacturer

Samples of the various types of materials handled are displayed in the sales rooms of the Electric Appliance Company of San Francisco, shown above. This concern is one of the many firms in the West rendering service to manufacturer and customer by sharing the manufacturers' risk and extending credit to customers.

to gage with accuracy his future production. The jobber takes the risk of being able to market the goods. The manufacturer is thus enabled by quantity production to reduce the price of his goods to the consumer.

By dealing with a comparatively few established jobbers whose credit is known the manufacturer is relieved of handling a diversity of accounts and maintaining a burdensome credit and collection department. The proximity of the jobber to his customers, makes possible a broadening of the market for electrical products by the extension of credit to customers who have no credentials other than the jobber's knowledge that they are good moral risks.

Jobbers realize that the justification for their existence lies in the rendering of a service. The methods by which this is accomplished are many and varied. Successful jobbers have elaborated and expanded upon the general duties of a wholesaler, so that prices and articles being the same, business is attracted by additional value which is created through some additional form of service.

The territory which a jobber covers is that territory contiguous to his place of business which he can economically serve, considering at all times the transportation rates from warehouses to customer and the time element involved. He serves intensively this territory, striving to obtain maximum sales results and to handle credit and collections to best advantage with minimum expense.

Salesman Is Great Educating Force

The jobbers' salesman, who is the means by which the contractor and dealer is put in touch with the manufacturer, must be of high caliber. Through the salesman the jobber extends his personal service to the dealers and contractors with whom he deals. The salesman is a business adviser. His counsel to the dealer as to a selection of materials, quantity of purchases, seasonal demands, window dressing, counter display, arrangement of shelves and store rooms is invaluable. The salesman may also instruct his customers in bookkeeping methods, and how to handle collections. He often extends engineering advice and helps the contractor to secure contracts by furnishing him with necessary information. In fact, in the jobbers' salesman lies one of the greatest educating forces in the industry. And just as quality and service are the measure of success of a product, so will the success of a distributor be measured by the quality of his salesman and the personal service he renders.

The jobber, with his large buying power and knowledge of world markets, gathers materials from all parts of the globe, stores them under one roof and has them ready for prompt delivery on short notice.

The Contractor-Dealer's Contribution to Electrical Service

SERVICE is any work performed for the benefit of another; a benefit or advantage conferred. In the electrical industry it partakes even more of an altruistic nature, for in the long chain from producing electrical energy to that point where it is put to some universal, yet personal, application, there is no service greater than that provided by the aggressive, constructive-thinking contractor-dealer, sometimes known as the electragist.

It is he who installs the medium through which application of the energy can be made. Whether it be homely old knob and tube work or the latest development in conduit installation, the job is worth many times its cost to the consumer in terms of satisfactory service.

It is through the contractor-dealer that the real "quality" of electrical service is expressed. In selecting the appliances and materials which stock his shelves, and in making the installations, using these materials to the best advantage, the electragist functions in terms of quality and service.

With a quality wiring installation, and this means adequate feeds, sufficient circuits, convenience outlets and plenty of them, switching and cut-out facilities, the real value of electrical service can be brought home to the consumer or the customer, as many central stations prefer to call him. This, however, depends on the realization by the contractor and the customer as to the necessity of high standards in the work and not on the dollars and cents basis where an outlet here and a switch there are eliminated from the job.

Only after the job is completed and the loop placed, can the motor be made to run, or the range to cook, or the electric music box to jazz, or lighting effects secured. This is where Mr. Average Man gets his real appreciation of electrical service. With the job well done, and a proper knowledge of applied electrical service, he can be made to grasp the real import of the work which the kilowatt can be made to perform in his store, office, factory, or home.

Electrical Contracting Specialized Service

Intelligent electrical contracting is a specialized service. It is something more than selling wire, pipe, boxes, fixtures, and lamps. In a way it is the fabrication of all this equipment, and more, into a workable machine energized by electricity which can be made to function as the servant of mankind at the flip of a finger.

Central stations may be said to sell electrical service but the contractor-dealer is the one who purveys it, for the reason that the energy in the abstract would not be worth anything were it not for the application which can be made of it through the facilities which bring the incandescent lamp, the motor, or appliance into play. Theirs is a service, a utility for which Mr. Average Man is willing to pay well when he is served intelligently and conscientiously.

Inter-relation of Branches of Industry

In making his part one of the supreme features of electrical service, the contractor-dealer has the assistance of all of the other branches of the electrical industry. The manufacturer, the jobber and the central station, through the agency of the various cooperative movements, are aiding him to carry his service message to the public. The representatives of the manufacturer and the salesmen of the jobber, are showing him methods whereby this service may be improved. His is a well fortified position for the rendering of service to the public. The goal of higher standards and better service is the aim of the entire industry. From now on the campaign will be waged in these terms if the electrical business is to succeed in the way it should. The establishing of merchandising departments by the manufacturers shows the trend of the times. It places distribution, sales and servicing above engineering and production. Economic balance demands that all branches of the industry co-ordinate accordingly.

A typical western contractor-dealer's store showing the good display windows used by this class of merchant and his service truck ready to deliver supplies to anyone who may need them in a hurry. This dealer's belief in his products is shown by the use of a large electric sign.

From the standpoint of merchandising equipment and appliances, the contractor-dealer's establishment is a specialty store. The whole point of the specialty store is specialized service. The contractor-dealer bases this conscientious service upon a proper understanding of the electrical business, which means giving service, showing by examples, the precepts of proper illumination, the elimination of loose ends in buying and warehousing, the absolute necessity of advanced selling ideas, aggressive advertis-

THE work of the contractor-dealer starts after the bare framework of the house is set and continues up to the time that he installs the last fixture and electric light bulb. The service of the contractor-dealer starts with the installation of the meter box and continues as long as the house may stand. An example of one phase of this service—adequate convenience outlets—is shown in the two accompanying pictures. Ten outlets were installed by the contractor-dealer in the room pictured of which only four are shown here.

ing, and the establishment of a reputation in the business world. Quality service is of no meaning unless backed by knowledge and reputation.

In the metamorphosis of business upheaval of the past two years, there has emerged a type of contractor-dealer who fully understands the functions of the specialty store and the specialized service which is expected of him. What the specialty store and its service means has been described by one of Colorado's most successful electragists, who says:

"I pretend that I am a customer interested in the purchase of some electrical merchandise. I then ask all the questions the average customer would expound and then answer them to the best of my ability. I try to get the customers' viewpoint for in that way I serve them best."

Electragists Strive to Serve Public

In his desire to give better service, this successful electragist studies his goods. He listens to the sales talk and helpful advice of the jobbers' salesmen and manufacturers' representatives. He asks his employees about the merchandise they sell. He reads trade papers and never fails to look at the advertising. He reads store advertisements and especially those of his compeitor. He consults books and is in fact "a walking encyclopedia" of helpful service.

This contractor-dealer is typical of the class of men who are making electricity and service synonymous. He knows that when the latent possibilities for merchandising success within the electrical industry become generally known the highest type of merchandising brains will be attracted. Competition will become doubly keen—only the fittest will survive. So he is preparing himself to render such complete service to his customer that he will insure his own survival.

This contractor-dealer or any with similar ability and ambition is removed from the storekeeper class. He fits equipment to the needs of his customer. He is in a position to intelligently advise on all problems of electrification as it affects the man in the street.

Early last fall this same contractor-dealer was called to a home by an elderly lady who, because of infirmities, could not look after the furnace or stoves during the day and thus keep the house properly heated. It seems she had heard that the radiant type of electrical heaters could be installed all over the house and the heating problem would be solved.

Instead of forcing a number of heaters on this unsuspecting old lady he told her frankly and candidly the part electrical heaters play as adjuncts to the main heating system when only lighting circuits are available for connection. Surmising her modest means, he knew that the system would be economically unsound. He explained carefully the reasons and, although disappointed, the lady admitted the impracticability of her idea. Later, however, he sold her one heater that became her constant companion.

Opportunities to Increase Service

Contractor-dealers have found that convenience outlets are the key to broader electrical service in the home. This is logical for the reason that where there is a way, application will be made. If there is no hardship or inconvenience in plugging in the toaster for the breakfast meal there is likely to be a desire to connect up the percolator or other table appliances at other meals. Electrical equipment will not be relegated to the shelves under such circumstances. Proper illumination effects can most easily be secured when portable lamps are available for connection with convenience outlets. The fullest use of electricity in the home is made possible through these outlets. In no place in the home can a better investment be made than in a proper and adequate wiring installation. Why not make it complete? Why not add to it instead of eliminating outlets for the sake of a lower price?

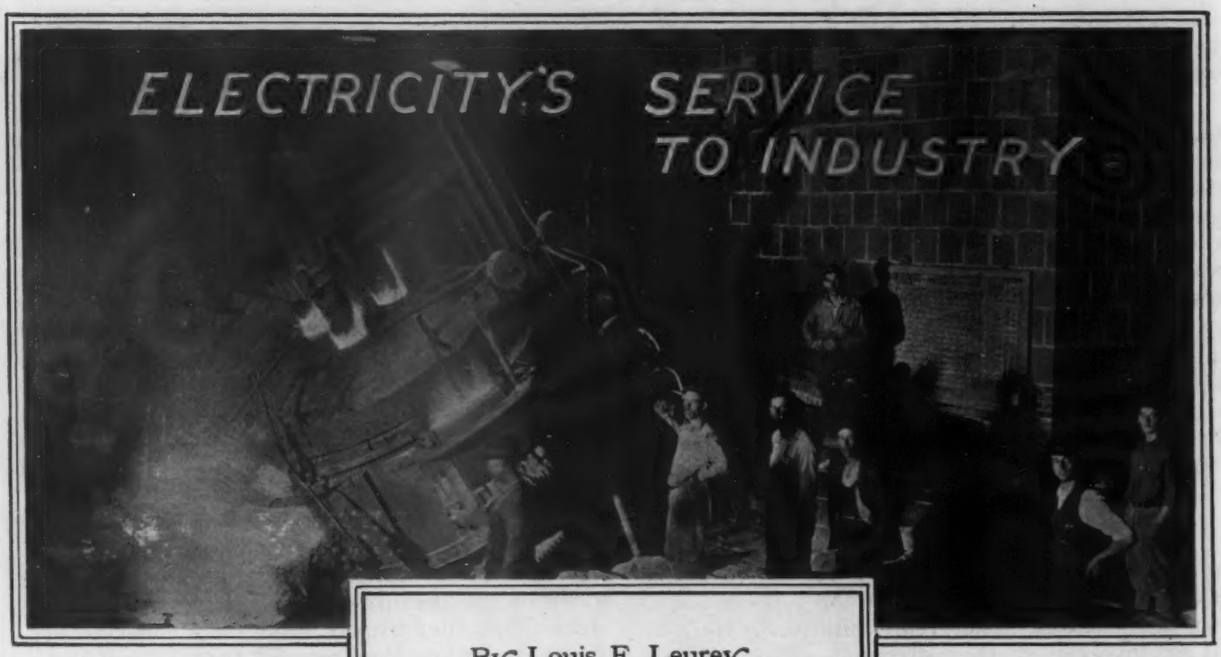
In some cities firms are found that do a plumbing and heating business along with their electrical activities and because of their experience in the former lines they usually make more complete electrical installations than some of the electrical brethren who believe in the saying, "Not how good but how cheap." If the plumbing business was based on this conception of service, it is believed that many of our modern homes would be found without a bathroom or running water in the house. Yet it was not so many years ago that this condition was an actuality.

Advancement of Proper Electrical Ideas

Let it be said right here that the electrical contractor-dealer is in an envious and vulnerable position to advance the ideas of proper electrification more than any other class in the industry.

The same situation applies to the servicing of equipment and appliances. No mechanical device is perfect at all times. Lack of knowledge on the part of many users is responsible oftimes for the short life of many appliances. In some cases there may develop defects but at any hazard when the equipment ceases to function and perform the duty intended and desired it becomes necessary for the electrical repair man to use his best ability in rehabilitating the device. Skilled service men whether it be on an iron or washing machine are employed. A stock of repair parts is kept on hand. This is where the electric specialty store differs from the department and hardware store. It is the one differentiating factor to be emphasized to the prospective purchaser of electrical equipment.

Service is the secret of success in any business. It is the keynote of the best thought in the electrical industry today. The contractor-dealer realizes service is progressive and may be constantly improved. The Chinese have a saying that is worth remembering——"If you bow at all, bow low." For the contractor-dealer, it means "playing the game one hundred per cent" by providing the fullest realization and appreciation of electrical service in all its ramifications.



By Louis F. Leurey

ALL four branches of the electrical industry have contributed to the splendid quality of electrical service which has been responsible for the rapid electrification of western industrial plants.

THE modern industrial plant is a common meeting ground for every department of the electrical industry, for no other user of electrical energy can show such a wide and varied field of application.

The applications of electricity in the industrial plant occur in three principal fields: first, in the department of motor drive where the electric motor has practically supplanted the steam engine, the gas engine and all of the older forms of prime movers in the driving of all classes of machinery. In some cases this change has been made by means of a single or several large motors which drive groups of machinery and in other cases by means of individual applications of one motor to each machine in the factory.

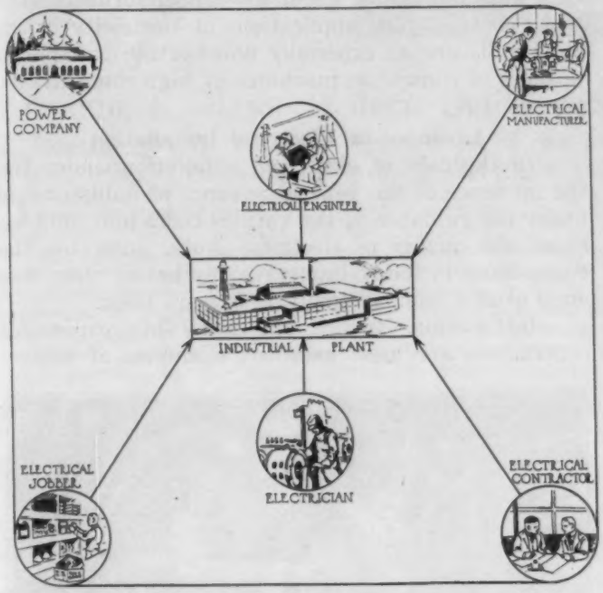
The second main field for electrical applications in the industrial plant is the use of electrical energy as a medium in carrying out some steps in the main manufacturing processes. Among the most notable examples in this class of electrical application is the use of electrical heat in japanning ovens, core ovens, porcelain kilns and bread baking, in all of which applications the perfection of electrical heat control has more than offset the comparatively higher cost as a fuel. Other uses of electricity as a medium in process work are exemplified in special devices for controlling temperatures of liquids, opening and closing of valves and gates by automatic control and the interlocking of conveying systems, all of which give to the modern industrial plant that perfection of control which was never possible of achievement before the introduction of these electrical features.

The third major application of electricity in industrial plants is in the form of modern illumination, and this one feature alone has been of untold value to industrial plants, especially those which have to operate throughout a twenty-four hour period. In a well planned, modern factory, with properly designed night illumination, there is very little to choose between the day output and the night output, from the point of view of efficiency. Modern illuminants properly applied have resulted in a quality of working light which at all times even exceeds that of the daylight, as it has that constant uniformity which never completely exists due to the varying changes in daylight conditions.

The introduction of these three main features of electrical application in the modern factory is the result of a continuous and consistent promotion effort by influences outside of the industrial plant itself. The first and what might be called the pioneer branch of electrical industry to exert its influence on the industrial plants is the electric power company. It must be remembered that when the pioneer power companies on the Pacific Coast were building up their networks, the industrial plants had been developed primarily by mechanical engineers, chemists, and manufacturers, almost none of whom had either experience or faith in electrical drive, and further, that these industrial companies at that

early period had incurred large investments in the form of steam plants and other classes of mechanical power.

It was thus the Herculean task of the power companies, not only to create faith in electricity as a new form of motive power, but also to demonstrate that its efficiency was sufficiently great to warrant the writing off of less efficient forms of power. That the power companies have achieved this great work



The graphic illustration above shows how the electrical industry serves the industrial plant. The four branches of the industry are all closely connected with each other and are directly in contact with the men in charge of industrial enterprises. The electrical engineer and the plant electrician are the men who are in most intimate touch with the conditions in the industrial plant.

exceedingly well is without question, and today on the Pacific Coast there is the most complete exemplification of electrical drive to be found in any part of the world.

The Work of Electrical Manufacturers

Working side by side with the power companies in these pioneer efforts, the manufacturers of electrical machinery and equipment carried out their share in the program and it is due in a great measure to the never-ceasing improvements which these manufacturers have achieved in all classes of equipment that electricity has been enabled to make such strides in industry.

With the development of an alternating current motor came an enormous stride in the industrial application of electricity and it may be said, to the eternal credit of the electrical manufacturing industry, that many of the first alternating current motors which they developed, are operating successfully today in many industrial plants and compare favorably indeed with the most modern motor developed. In the field of electrical control, however, the manufacturers were not so fortunate in reaching their stride in the earlier applications, for the modern industrial plant today enjoys a perfection of control which would certainly have been the envy of any of the earlier applications. The whole trend of modern control development is the gradual elimination of the human factor and human error in the starting, stopping and varying of electrical impulses, and no finer example exists of the utter dependability of electricity as a motive force than the accuracy with which these devices now function day in and day out without interruption or failure.

Need for Skilled Installation Men

Paralleling the work of the power companies and the manufacturers of electrical equipment, there came the economical necessity for an organization capable of furnishing the necessary skilled labor and materials for properly installing electrical equipment within the industrial plants. In the very early days some of this work was done by the manufacturers and power companies, due to the lack of trained men outside of the industry, but with the growth of industrial plants came the development of electrical contracting firms as we know them today, which undertook for the industrial plant the furnishing of an organization that would properly install all electrical equipment, so that it would not only be free from operating troubles but that the plant would also be safeguarded against fire hazard, the principal risk which existed from improper installations of electrical wiring and equipment.

With the extremely rapid development of electrical applications and the enormous multiplication of electrical devices, it soon became necessary for some stable commercial body, formed on the basic principles of good merchandising, to handle the enormous stock of supplies which was required by the electrical contractor and the growth of the modern electrical jobber was the outcome of this demand. The jobbing business has increased from original small dimensions into concerns of national importance, in whose stockrooms can be found every device that enters into the whole range of electrical applications and whose inventories run into enormous sums of money annually.

Electrical Organization Within the Plant

All four of these major branches of the electrical industry are naturally closely interlinked and each has contributed his share to that splendid quality of electrical service which, more than any other thing, has been responsible for the enormous growth and speed of electrical applications in the early stages of electrical development in industrial plants. These branches have of necessity had to overlap one another in their effort to promote a unified installation, and all of them have maintained, through force of necessity, engineering staffs who have contributed a high quality of development to apparatus and to principles that were originally worked out in the laboratory and designing rooms. In fact, it can be said without exaggeration that practically the entire earlier development of electrical applications in the industrial field has come from outside the industrial plant and has been the result of independent and concerted effort of the power companies, electrical manufacturers, electrical contractors and jobbers.

Until comparatively recent times the electrical policy within the industrial plant was controlled and developed by the original group of mechanical engineers, chemists, and manufacturers who had developed the original processes, equipment and mechanical drive, and the only electrical talent employed by these controlling forces was the practical plant electrician. These electricians were quite often men who had been operating as mechanics, employed by the electrical contractor who installed the original electrical equipment in the factory. Again, they would be drawn from the service department of the electrical manufacturer where they had learned the art of winding motors and making all classes of electrical repairs, but rarely if ever were they drawn from a trained engineering staff of any of the plants. The development and training which these men had received came primarily from their own experiments within the industrial plant and aided by the advice and assistance which they had received from the engineers and service men of the major branches of the industry.

In the last few years, however, the magnitude and importance achieved by the electrical applications in the larger industrial plants has forced the recognition and employment of trained electrical engineers who have developed from within the industrial plant a policy of efficient and co-ordinated application which could not otherwise be ever fully accomplished.

Due to the pioneer influences indicated in the earlier part of this article, the major electrical groups, namely, the power companies, manufacturers of electrical equipment, electrical contractors and electrical jobbers, were gradually led into a policy of over-servicing the owner of the industrial plant. As these owners had looked originally in the pioneer days for engineering advice on all electrical questions, so they continued to look to the major groups, but fortunately this condition is now being gradually eliminated. The major groups of the electrical industry recognize that their own interest is best served by the intelligent development of electrical knowledge within the industrial factory. The increasing magnitude of electrical usage in the factory has convinced the industrial manager that not only is electrical engineering within the factory a necessity but that it is the most economical administration that can be obtained. Today the modern industrial electrical engineer is taking his place as a complete and efficient interpreter between the electrical industry and the industrial world in general.

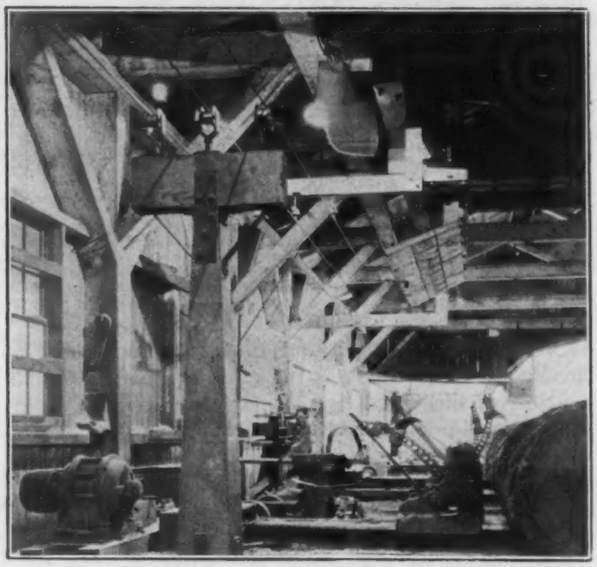
In the field of power service, the gradual extension of electrical knowledge through the industrial plant has produced a much higher degree of co-operation between the users of electricity and the public utility companies. This is evidenced by the much higher class of receiving substations which are being built and by the much wider application of synchronous motors and other devices which not only tend to improve the character of the load to the central station company but also to improve the efficiency of the application within the factory.

In the realm of electrical motors and equipment, as pointed out before, the modern tendency is to refine equipment to the point where the errors due to the human factor are practically eliminated. Not only does this result in a far lower upkeep in electrical apparatus but results in a correspondingly increased output from the machines controlled. This control equipment has in fact made possible many substitutions of electrical drive for mechanical drive that were impossible under the cruder forms of electrical control. The applications of electricity in the steel mills are an especially noteworthy example of fineness of control on machines of high concentrated power.

Advances in Electrical Installation

In the field of electrical installation under the the influence of the general advance of industry and under the guidance of the various codes and commissions, the quality of electrical work done by the contractors is today immeasurably better than was done even a comparatively few years back.

Installations turned out today by responsible contractors are most excellent examples of protection against fire risks, interruptions to operation and an almost complete absence of personal hazard. The appearance of electrical installations has changed from what was formerly the least attractive part of an industrial installation into one of its show fea-



A 10-hp. induction motor driving the power set-works for a log carriage in the Carlisle Pennell Lumber Company mill at Onalaska, Wash. Power for driving the motor is secured from three trolley wires which may be seen in the upper left hand corner of the picture. This is only one of the electrical installations that have been devised by men of the electrical industry for the use of sawmill operators.

The one thing now needed beyond anything else in the final development of the use of electrical energy within a factory is the creation within the industrial plant of the habit of thinking in electrical terms, so that no matter what the problem under question is—be it one of motor drive or be it one of process application—the management of the industrial company will naturally turn, for a solution, to Electricity—the Universal Power.

JOBBER, DEALER AND SALES AGENT

Airplane Used as Modern Delivery Service Aid

General Electric Company Sends Motor to San Joaquin Valley Dealer Showing Opportunity for Rapid Deliveries

Use of the airplane for delivery purposes was recently adopted by the General Electric Company's San Francisco office. A rush order for a 1-hp. motor was received from the Turner Hardware & Implement Company of Modesto, Calif., at 11 o'clock one morning and by 2 o'clock of the same day the motor was in the hands of the dealer. The best possible delivery that could have been secured by ordinary express would have been at 9 o'clock of the following morning.

The motor sent by the General Electric Company weighed 100 lb. and the charge for delivery was $35. This cost is rather excessive when first noticed, but if the conditions which often necessitate a quick delivery are considered the charge of 35 cents per lb. will not seem excessive.

The chief use that will be made of this aero express service, will be for the sending of motor parts. These parts may be ordered by telephone and will be delivered to the points in the San Joaquin Valley that are touched by the aero express service which is operated by the Pacific States Express Company. At present Stockton and Modesto are the two cities reached by this express service, but the company plans to extend service to Sacramento, Fresno, Bakersfield and Los Angeles.

Motor parts are not excessively heavy, and therefore it will be possible to secure these at a cost which will not be prohibitive, should conditions necessitate a speedy delivery. Among those to be benefited by this extension of the General Electric Company's delivery service will be all sorts of industrial plants in the valley, canneries, etc., and also farmers who are in urgent need of pumping equipment for irrigation.

Transferring the motor from truck to airplane at the landing field 30 miles below San Francisco. The trip from this point to Modesto, a distance of 80 miles, was made in 1¼ hours. Airplane transportation is adapted principally to the delivering of small parts.

Manual of Estimating Prepared for Association Men

As the result of the composite work of the actual experiences of a number of practical estimators, has come the Manual of Estimating of the National Association of Electrical Contractors and Dealers. This piece of printed matter has just come from the press and is to be distributed among the members of the association only. It is said to be one of the most useful pieces of literature ever distributed by the national body.

The Manual is in pamphlet form and is classified in four parts: (1) Taking Off Material and Use of Forms; (2) Labor Cost Data; (3) Job Conditions Affecting Branch Circuit Work; (4) Tables of Standard Times. This last section contains sixteen tables which include standard times on branch circuit conduit, outlet boxes, cabinets, lighting and motor circuits, switches and plug receptacles, and such work as comes to the contractor daily.

A discussion of the methods of arriving at unit costs and labor cost data in general are contained in the second part. This material is all explanatory of the tables and takes up the efficiency of electrical workers. It also shows how to figure their time and how to arrive at the proper figures in applying labor costs to the job.

The Manual is the result of several years of study and research on the part of those members of the Cost Data Committee of the association. Arthur L. Abbott of St. Paul, Minn., has been the chairman of the committee for the past two years. In addition to the Manual of Estimating, Mr. Abbott has brought out a set of forms which he recommends for use with the Manual. Actual use of these forms has proved their utility and value.

All of the methods and systems described in the Manual have been tried out under actual working conditions and have been highly praised by the electrical contractors who made the experiments.

The Mine and Smelter Supply Company in Denver has made several additions and changes to its personnel, according to an announcement made by S. M. L. McSpadden, local manager. E. K. Bacon will return to the Denver headquarters from the Wyoming territory, while H. E. Leigh, a former central station man, has been added to the Westinghouse departmeit. R. S. Rubincam has returned to take charge of the mill supply department. Jim Ryall, head of the electrical department, is making a tour of the entire territory. H. J. Gundlach, general manager, is reported improved in health although still under a doctor's care.

F. X. Kaffer, district representative in Denver of the **Consolidated Lamp and Glass Company,** is assisting W. J. Keating in establishing the new fixture jobbing business of the **Electric Supply and Construction Company.**

ALL SARDINES DO NOT COME IN CANS

Pictures No. 1 to 4 show what the Strawberry reservoir of the Utah Light & Power Company has to offer in the way of fish. No. 1 shows a group from the Provo division of the company with their catch. No. 2 demonstrates that the men in the Ogden division are fair(?) fishermen. No. 3 shows Byron Clark, with some of his catch. No. 4 shows E. D. Bean, from Maine, demonstrating how they carry codfish. Pictures 5 and 6 show M. W. Scanlon, publicity and merchandising expert of the San Francisco Westinghouse Electric & Manufacturing Company, with two Huntington Lake trout. Below him is R. C. Smith, advertising manager of the Journal of Electricity and Western Industry, with the same two fish—those fish weren't caught, they were speared. George B. Sanford, Sacramento division manager of the Great Western Power Company, caught the two blue cod in No. 7. Claude S. Clay of the Mountain Electric Company of Denver, caught the 7¾-lb. rainbow trout in picture No. 8.

Seattle Dealer Finds Modern Store Business Asset

Believing that to bring business to his store a dealer must not only have the best appliances and wares on the market ready to display to his customers, but that he must also have an attractive and up-to-date store, has brought Hugh A. Wilson to a place near the top in the electrical business in Seattle, Wash. Fifteen years ago Mr. Wilson opened an electrical store under his name and ever since he has been the owner and active manager of his firm.

The present store has been occupied by the electrical dealer for about a year. It is a brick and tile structure of pleasing architectural design, and equipped with adequate floor space and good display windows. Situated as it is in the University district of Seattle, the attractive front serves to encourage prospective purchasers to enter the store.

The interior is so arranged that persons who enter it are able to see the various appliances and electrical devices that are placed on shelves around the walls of the store. The entire store is well illuminated, giving the prospective buyer another opportunity to see for himself the stock that is carried without making the salesman remove it from the shelf. As soon as a customer asks about any article the salesman brings it to him to allow him to view it at close range.

Mr. Wilson pays a great deal of attention to his display windows, keeping them well decorated at all times with modern appliances. The displays are changed frequently and are made to tie-in with any advertising that he may be conducting at the time. The windows are well lighted at night, thus allowing women the opportunity of bringing their husbands to see the electrical devices after office hours.

In addition to carrying on a retail business the firm specializes in time and material contracts and stands prepared to submit competitive figures on any jobs where the customer may so desire. A large line of appliances and fixtures is also carried for the jobbing business conducted.

Before coming to Seattle in 1907 Mr. Wilson was associated with the Wagner Electric Company of St. Louis, first in the factory and then as a salesman. While holding the latter position he was on the road for three years.

ARE YOU THROWING STONES IN YOUR WELL?

By JOE OSIER

Many years ago, before the bobbed hair pestilence stalked into our midst and—

"Sweet Mamma—Papa's Getting Mad" became the national air,—

Some Sheik—I've quite forgotten his name and his racket—

Clambered down from his high powered nag and let go of this keen remark:

"Throw not a stone into a well from which thou drinkest."

And, because I know that there are many men in the electrical industry today who are spending a major portion of their time heaving stones and like litter into their own and others' wells—

I have determined to dedicate myself—

For the next few minutes—

To the abatement of this evil.

Therefore, in order that I may not appear prejudiced or unjust in my accusations—

Allow me to place on the stand the Chief Offender, John Goof—the man who raps the business—

His own and others'—

From the naughty word to breakfast—each and every day.

For let it be known that John is the Boy who shouts loud and lustily that—

"Business is rotten"—"The buying public are a bunch of boobs"—Manufacturers are brigands and the wholesalers are stick-up men and—

"Further and more" (as another famous humorist is reported to have said)—

That "any man who even contemplates engaging in the business should be given rapid transportation to the foolish foundry."

And so John Goof raves on and some men—

Who should know better—

Listen—and others, who know more—

Laugh and remark from the corners of their mouths:

"Why think of thy virtues, O Onion, since every bite draws tears?"

But, seriously speaking—if one may be permitted to speak seriously in an alleged funny column—

The smart Men of the Electrical Industry—and their name is Legion—

Are not concerned over John Goof and his half-baked cohorts.

They are too busy learning, planning, expanding; bending their efforts to benefit the public generally and—

Themselves specifically—to take time out to listen to a man who knows no better than to hurl stones into his own well.

They know that John has refused to hear Opportunity's knock; that he has short changed himself; that he is paging the Sheriff and—

So they go on about their business leaving John Goof in the orchestra pit by himself—

Where he can play: Darlink, I yam growing old—and—

Over the Hills to the Poor House—to his—

Leaking heart's content.

Yea, verily, 'tis my pleasure, in this fearless column, to—

Lift up my voice and say that:

The day of the Calamity Howler and the Yawp artist, who have always cluttered up the Road of Progress—

Is fast finishing. They are being slain and their hides ornament the tumble-down shacks along the wayside.

Their day is about done—their song almost sung, and—

They have come to know that—

"At the narrow passage, there is no brother and no friend."

This brick and tile store front presents a pleasing picture to the eyes of the passers-by who are thus encouraged to enter the store and give the dealer an opportunity to interest them in the electrical equipment carried in stock. The window display is changed frequently and an effort is made to carry an air of refinement by the use of a few appliances well arranged throughout the large window. The store is that of Hugh A. Wilson at 4318 University Way, Seattle, Wash. The firm has been in this location a little over a year.

INDUSTRIAL NEWS

Pit River Plant No. 1 Opened by P. G. & E. Co.

Three Construction Records Are Smashed When Plant and 220,000-volt Line Are Put in Operation

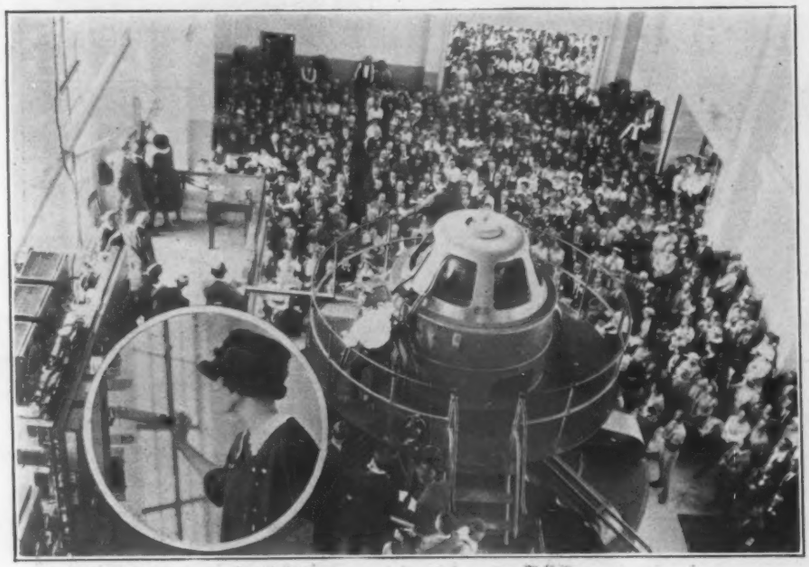
When electric lights glowed and an American flag was slowly pulled up the pole, by a motor to which the halyards were attached, the waiting crowd, at Vaca substation, realized that the Pit River No. 1 plant of the Pacific Gas & Electric Company had been completed and put in service and that electricity was officially being transmitted 202 miles at 220,000 volts for the first time. Just at 4:30 o'clock on Sept. 30, before an assemblage of about 200 bankers, business men and engineers, Miss Isabel Creed, daughter of Wigginton E. Creed, president of the company, closed the switch which started the water into the turbines which drive the two 35,000-kva. generators installed at the plant in Shasta county, Calif.

The opening ceremonies were under the direction of civic organizations of northern California and speeches were given at Pit No. 1 and Vaca substation, by leaders of these bodies, congratulating the Pacific Gas & Electric Company upon their enterprise. Wigginton E. Creed responded for the company at Pit No. 1 and John A. Britton, vice-president and general manager, spoke at Vaca substation.

The official opening of Pit No. 1 smashed three records in generation, transmission and transformation of electrical power. The two 35,000-kva. 60-cycle generators located in the new plant are the largest of their type in the world, while the 202-mile transmission line which is operating at 220,000 volts is carrying the highest voltage of any commercial line installed up to this time. The Vaca substation is the first to be constructed anywhere for 220,000-volt operation.

This plant is the first unit of a series of five to be constructed by the Pacific Gas & Electric Company on the Pit River, at a cost of $100,000,000. The other four units are to be completed by 1935. The power generated at Pit No. 1 raises the installed capacity of the company's system to 595,000 hp. The cost of the Pit River development to date, including transmission lines, is approximately $18,000,000.

That the Diamond Creek site on the Colorado River will be used for developing hydroelectric power is the opinion of Congressman Carl Hayden of Arizona. The proposed plan for development was worked out by James B. Girand.



Interior of the Pit River No. 1 power plant of the Pacific Gas & Electric Company, showing one of the turbine generators which was started when the water was released by the closing of a switch just after this picture was taken. Miss Isabel Creed, daughter of President Wigginton E. Creed, is seen in the insert in the act of closing the switch.

Denver to Experiment with Gas as Home Heating Fuel

To make Denver "The Smokeless City of the World" is the plan of Henry L. Doherty, president of the Cities Service Company of Denver, Colo. Toward this end it is his plan to take 100 representative homes this winter, and supply them with gas as a heating fuel at a low rate, to determine if it is possible and practicable to heat Denver homes in this way. The Denver Gas & Electric Company, which is a subsidiary of the Cities company, expects to lose money on the gas sold to these homes during this winter, as gas consumption in the city is not large enough to get quantity low prices.

If the experiment proves that gas is a practical fuel for use in the cold weather that Denver is subjected to, arrangements to supply more homes next winter will be made. With this additional demand for gas it is Mr. Doherty's belief that gas can be supplied to the citizens of Denver at a cost below that of coal.

Point Grey B. C. Will Install Electric Light Plant

The municipal council of Point Grey, a suburb of Vancouver, B. C., passed a resolution recently, authorizing the solicitor of the municipality to prepare a money by-law to cover the cost of the erection of an electric generating and street lighting system, at an approximate cost of $135,000.

The British Columbia Electric Railway Company offered to maintain the street lighting system at a flat rate of $60 per lamp per year, but the council decided that municipal ownership of the plant will soon pay for the cost of installation, by the saving thus effected. Besides the street lighting, it is proposed to light all the municipal buildings from the new installation.

Turlock Advised to Distribute Own Electric Power

Members of the Turlock, Calif., chamber of commerce have advised the city to purchase the distribution lines within the city limits and to take charge of the distribution of power there. This action was taken after the irrigation district had brought condemnation proceedings against the Pacific Gas & Electric Company.

The board of directors of the Turlock Irrigation district has already been given a franchise to build power lines within the district. The franchise also permits the construction of equipment essential to the transmission of electrical energy.

WINNERS OF "SERVICE" PHOTOGRAPH CONTEST

Out of the ninety-seven photographs received by the Contest Editor of the Journal of Electricity and Western Industry as entrants in the "Service" picture contest, 14 prize winners have been selected by Chester Rowell of the California Railroad Commission. Great interest was shown by a large number of men of the electrical industry and some excellent photographs were received.

All of the prize winning pictures appear in this issue. The first prize of $20 was awarded to H. S. Furlong, assistant publicity manager of the Pacific Gas & Electric Company, San Francisco. The picture was entitled "Battling the Snows to Keep the Lights Burning" and appears on the lower center of page 274. "Heroism in the Line of Duty," a picture submitted by F. F. Barbour, assistant to the general manager of the Great Western Power Company, San Franicsco, won the second prize of $15. This picture appears in the center-left of page 275. W. H. Brown, statistician for the Southern Sierras Power Company, Riverside, Calif., was awarded the third prize of $10, for the picture he submitted which appears on page 279 and was entitled "Service in the Face of Difficulties."

The eleven $5 prizes were awarded to the following men: Fourth prize, "Back of the Service," by Sidney W. Green, San Joaquin Light & Power Corporation, Fresno, Calif., on page 272; fifth prize, "Lineman's Dangers," by W. G. Drew, California Oregon Power Company, Medford, Ore., on page 276 at upper-right; sixth prize, "Patrolling the Lines in Winter," by W. R. Putnam, vice-president and general manager Idaho Power Company, Boise, Ida., on page 276 center-right; seventh prize, "Breaking the Trail to Make Repairs," from W. G. Drew, California Oregon Power Company, Medford, Ore., on upper-left of page 276; eighth prize, "One of the Courtesies of Service—Keeping the Power On for the New Tenant," by J. D. Scott, commercial engineer, Portland Railway Light & Power Company, Portland, upper-center page 275; ninth prize, "Repair Wagon and Tool Equipment," from F. F. Soder, Pacific Gas & Electric Company, Corning, Calif., center-left page 274; tenth prize, "Service Cars," J. D. Scott, commercial engineer, Portland Railway Light & Power Company, Portland, bottom of page 275; eleventh prize, "Service Telephones," from J. D. Scott, commercial engineer, Portland Railway Light & Power Company, Portland, center-right page 275; twelfth prize, "Bringing Electric Service to the Home," by Sidney W. Green, San Joaquin Light & Power Corporation, Fresno, Calif., center-right page 274; thirteenth prize, "Carrying Cement by Pack Train for the Rush Meadow Dam," from E. M. Dighton, traveling auditor, Southern Sierras Power Company, Riverside, Calif., upper-left page 275; fourteenth prize, "Delivering Ranges by Hand," from J. D. Scott, commercial engineer, Portland Railway Light & Power Company, Portland, upper-right page 275.

Checks have been mailed to the winners of the contest.

Utah Rivers Investigated By Reclamation Engineers

W. M. Green, engineer in charge of investigations in Utah for the United States Reclamation Service, has returned from the Dead Man's Bench project on the lower White River. R. R. Robertson, engineer, and party have completed a rough investigation of the area of irrigable lands under the proposed project, of which the feasibility is being determined. About six weeks more will be required to run a survey back to the White River to determine where diversion works might be constructed.

W. L. Drager, assistant engineer for the reclamation service, is at the head of a party which is running a "fly-line" from the end of the canal at Magna, Utah, into Tooele county, in connection with the investigation of the Provo river system end of the Provo-Weber project. This work is also under the direction of Mr. Green, who is in charge under a cooperative agreement between the state and the government. This agreement has for its aim the determination of the feasibility of various proposed irrigation projects in Utah, with the idea in view that the reclamation service may undertake additional projects.

Will Make Improvements to Oregon Power Plants

The Yamhill Electric Company, Newberg, Ore., has acquired through purchase, the lighting plants at Willamina, Amity and Sheridan, Ore. Improvements are now being made in these plants and pole lines will soon have them connected up with the main network.

About 13 miles of 11,000-volt line will be built and 5 miles of old line will be rebuilt. This will add 150 to 200 kw. demand to the Yamhill company's lines and will insure a more satisfactory service.

The Rockton Lumber Company has recently filed articles of incorporation with the corporation commissioner. This company has been formed to engage in timber, logging and sawmill business on a capital of $50,000. The papers were filed by J. Bowerman, Yeon Building, Portland.

Employees to Receive Benefits of Group Insurance

Announcement has just been made by John A. Roebling's Sons Company, Trenton, New Jersey, to the effect that all employees, who have been with them a year or longer, on Sept. 1, 1922, will be protected by group life insurance and pension plans. By arrangements made with The Equitable Life Assurance Society of the United States, the insurance went into force automatically on midnight of August 31.

The insurance is graded according to length of service, all employees more than one year and less than two years with the company to receive $500, increasing $100 each additional year of service until the maximum of $1,500 is reached for eleven years of service and over.

A pension plan is also provided which allows for the retirement of males at the age of 60 yr. and females at the age of 55 yr. Pensions will range from $25 to $250.

Lake Quinault Timber to be Sold To Highest Bidder Nov. 1

A block of timber situated near Lake Quinault, in Grays Harbor county, Wash., and owned by the Quinault Indian Reservation, embracing 388,000,000 ft., to be known as the Lake Quinault Logging Unit, will be offered for sale by the Department of Indian Affairs November 1. Bids will be received by Supt. W. B. Sams of the Reservation at Taholah, Wash., The bid call specifies that a check for $20,000 must be submitted with each proposal to purchase, and the successful bidder must thereafter furnish a bond of $50,000.

Ten million feet of timber must be removed from the sale area prior to April 1, 1927, and at least 25,000,000 ft. each year thereafter until the contract expires on April 1, 1942. This is the third largest unit of the Quinault Reservation timber offered for sale.

Fresno Power Company to Erect Ten Story Building

Construction of a 10-story office building in Fresno, Calif., to cost approximately $600,000, for the San Joaquin Light & Power Corporation, has been started and the work will be speeded along in order that all of the offices of the company may be housed in one building as soon as possible. At present these offices are situated in a number of buildings around the town and a lack of efficiency results.

This building will be Fresno's tallest and according to specifications it will be the most brilliantly illuminated in the Southwest. Flood lights, in colors, will be used to produce a spectacular appearance at night and it is believed that the building will be seen many miles from Fresno. A large electric sign will be placed upon the roof of the structure when completed.

The lease and operation of the electric light and power plant of White Sulphur Springs, Mont., have been taken over by T. T. McArthur, who has had charge of the plant for the last two years. T. J. Twohy owned the lease up to the present time.

Events in Washington of Interest to Western Men

A Survey of Recent Developments in the Nation's Capital by Paul Wooton, Special Correspondent of the Journal of Electricity and Western Industry

The fear being expressed in sundry quarters that there will be over expansion of hydroelectric development in certain regions of the West does not alarm Col. William Kelly, chief engineer of the Federal Power Commission, who has just made an extensive survey of the situation on the principal power-producing streams on the Pacific Coast. The fact that the development is in advance of immediate needs makes for cheap power, he points out. This tends to attract industries. The demand in the East that public utilities be given the first call on hydroelectric power will be the cause of increasing concern on the part of industrial consumers of power and Col. Kelly expresses the opinion that a very large number of such concerns may well enter upon studies as to whether or not it would be to their advantage to undertake operations in a region where cheap power now is available and where almost unlimited quantities of additional power can be made available as rapidly as it is needed. He realizes that the distance of western power from some markets offers an obstacle which cannot be overcome in all cases but those industries in which power is a relatively large factor should be considering, he says, whether or not the western situation cannot be turned to their advantage. Col. Kelly does not expect to see any exodus of eastern industries to the West, but he does believe there will be an increasing transition as power costs in the East increase.

The success of the Southern California Edison's financing indicates to Col. Kelly that public sentiment among the people of the West is overwhelmingly in favor of the maximum utilization of the great power resources of that region which have been allowed to remain dormant so long.

Col. Kelly pointed out that an important factor in stimulating water power development in the West was the high price and scarcity of fuel oil at about the time the Water Power Act was passed. Since that time the fuel-oil situation has become more satisfactory and many of the plants which expected to be forced to use other power have been able to continue the use of their oil-burning equipment. Since there is no certainty as to the length of time that fuel-oil will be available at present prices, Col. Kelly observed a general uneasiness on the part of the industries using that fuel for power purposes. As a result he believes there will be a gradual turning to hydroelectric power on the part of existing industries.

The Department of the Interior has decided to call for bids in the near future for the royalty oil accruing to the Government in the Salt Creek and Cat Creek fields in Wyoming and Montana respectively. This oil heretofore has been sold to the Shipping Board, but on the expiration of the present contract, competitive bids will be sought.

At present the royalty oil in the Salt Creek field amounts to 8,200 bbl. per day. In the Cat Creek field it is averaging 500 bbl. per day. Since these are high-grade, paraffin base oils, and since it is believed that the production in each of these fields will increase, and since the contracts are to be for five and ten-year periods, the amount of oil involved is large.

The long standing controversy over the accounting regulation, which eventually is to be promulgated in connection with the administration of the Water Power Act, bids fair to be settled as a result of extended conferences in Washington in which officers of the Federal Power Commission, representatives of the National Electric Light Association, representatives of the Natonal Association of Railway and Utilities Commissioners and a number of the officers of electric light and power companies have taken part. These around-the-table conferences are expected to result in substantial uniformity in the accounting system for the use of licensees under the Water Power Act, and for promulgation by the regulatory bodies of the several states.

During the conference the chief accountant for the Federal Power Commission agreed to make a number of changes and modifications in the revised tentative draft of the proposed accounting system, which formed the basis for discussion at the conference. The representatives of the National Association of Railway and Utilities Commissioners agreed on their part to recommend important changes in and modifications of the proposed uniform system of accounts for electric utilities adopted by the Association at its 1920 convention. The chief accountant of the Federal Commission will lay the following recommendations before the Commission:

"With the understanding that the accounting committee of the National Association of Railway and Utilities Commissioners will recommend to the association for adoption certain corrections, changes and amendments conditionally agreed to, the chief accountant of the Federal Power Commission is willing to lay the following recommendations before the Commission:

"(1). To insert in the revised tentative draft a clause to the general effect that the functional classification of non-project land and structures will not be required but that if the licensee so desires all non-project land may be included in a single land account, and that all non-project structures may be included in a single structure account. So far as non-project land and structures are concerned the accounting is to be optional. As to project land and structures, he is willing to insert a clause to the general effect that where, in case of peculiar conditions, it seems impracticable to classify project lands and structures according to the prescribed accounts that licensees may bring the matter to the attention of the Federal Power Commission and that consideration will be given to permitting a special classification.

"(2). To create another general group of fixed capital accounts for certain transmission and distribution fixed capital in which to include the cost of capital used jointly for transmission and distribution purposes where it is impracticable or undesirable to assign or allocate such costs to other specific transmission or distribution fixed capital account.

"(3). To make such other and further changes in and correction and modification of the other fixed capital accounts and the general instructions relating thereto as were agreed to by the conference.

"(4). To change the title and text of certain balance sheet accounts which are now in both drafts, to agree with the title and text of the national committee's draft where the language used by the national committee clearly expresses the meaning intended to be conveyed and further to make such changes in the balance sheet account as were agreed to in conference. Unfinished construction is to be retained as a balance sheet account and is not to be included among fixed capital accounts.

"(5). To make such changes in the general rule or in any other rules or accounts which may be necessary to make it clear that nothing in the system of accounts for licensees is intended to relieve the licensees, which are public utilities, from conforming to all accounting rules prescribed by the state commission, including such rules which may be applicable to the project property or any other rule or regulation of the state regulatory body.

"(6). To carry out in good faith all promises made during the conference as to changes in accounts and rules not specifically referred to and to consider carefully the matters discussed concerning which no definite conclusion was reached or promise made.

"(7). It is not proposed to depart materially from the general plan and general arrangement of the accounts as at present set forth in the revised tentative draft and only to make such modifications of and changes in the accounts themselves as already have been indicated, preserving the general plan and arrangement in all material aspects."

Logan, Utah, Applies for Water for Power Generation

An application by the city of Logan, Utah, for 125 sec.-ft. of water to be taken from the Logan River below the state dam, has been filed with the state engineer of Utah. The proposal of the city commission of Logan is to convey this water by a pipe line to the site of the old Deseret mill two blocks east of the main business block, where the city may erect a new electric power plant.

The report of the engineer shows that a fall of 106 ft. can be secured which will develop 550 hp. at the lowest stage of the river while 1,200 hp. can be generated with the river at its highest recorded stage. Lengthy transmission lines will be unnecessary as the plant will be located in the center of the city.

If this plant is installed it will be able to supply the entire needs of the city, and will supplant the power taken from the Utah Power & Light Company. This company supplies 56 per cent of the power used at present.

Reconstruction Plan Undertaken By San Diego Railway

Reconstruction plans for the San Diego Electric Railway company of San Diego, Calif., call for an expenditure of approximately $1,000,000, according to statements issued by officials of the company. The improvements recommended by the state railroad commission and the city transportation committee are included in this plan.

Since March of this year $400,000 has already been spent and the cost of jobs for which materials are already purchased will be about $700,000. These figures do not include the cost of work planned but for which the materials have not yet been ordered. Expenditures for rolling stock, machine shops, or work not of a reconstructive nature have not been estimated by the company.

This program of reconstruction has all occurred since Claus Spreckels has taken charge as general manager.

Water Power Subject of Engineers' Discussion

Six Hundred Members Attend Fall Meeting of American Society of Civil Engineers Held in San Francisco

Water power and its attending engineering problems was the principal subject taken up at the fall session of the American Society of Civil Engineers held at San Francisco Oct. 4-8. Over 600 members were registered in attendance at the convention, which, according to John R. Freeman, president of the society, was the best and the one at which the most beneficial comment was presented, that the society has held.

President John R. Freeman opened the meeting Wednesday morning with a comparison of modern hydroelectric practice with that of early developments, as he saw it exemplified a few days before at the opening of the Pit River plant of the Pacific Gas & Electric Company, in northern California. He brought out the fact that here in a modern hydroelectric development one of the 40,000-hp. Pit River units develops more power than the combined output of the 150 installations in the vicinity of Lowell and Lawrence, Mass., when he began his water power work, only fifty years ago. In an illustrated talk on the Columbia River development, A. P. Davis, director, U. S. Reclamation Service, Washington, D. C., stated that it can be made to develop 6,000,000-hp., and irrigate 6,000,000 acres and because it is navigable for over 400 miles, it involves international rights. The complete and efficient use of the river for power, the speaker emphasized, requires large storage, though in his opinion the most important and far most urgent need of storage is the control of the destructive floods over the lower valleys by the river every year. J. B. Lippincott, of Los Angeles, in discussing Mr. Davis' paper, said that the entire summer flow of the Colorado is now being diverted and that the time has already come when the storage of flood waters must be begun, and expressed a hope that the U. S. Reclamation Service would be able, with federal aid, to undertake the development of storage and power on the Colorado, but if that could not be done soon, that federal authorities would at least allow private enterprises who stood ready, to undertake such development.

O. C. Merrill, executive secretary of the Federal Water Power Commission, stated that there is now more water power development under construction than at any previous time in the history of the country.

F. H. Fowler, district engineer, U. S. Forest Service, San Francisco, in his paper on "Water Power Potentialities of the Pacific Coast," showed that practically all the western coast is within a 500-mile radius of the two great sources of power on the Colorado and Columbia rivers. The enormous power possibilities here, however, cannot be developed economically, except in large blocks and consequently markets for the power must be found before development will be feasible. West of the Rockies coal and gas can compete with hydroelectric power only in very small areas or under special conditions, and in the long run oil cannot be a competitor of hydroelectric power. The entire western region, he said, could be supplied from developments on the Colorado and Columbia rivers, if the transmission of this power could be successfully accomplished over distances of 500 miles.

John D. Galloway, consulting engineer of San Francisco, presented a paper on "Hydroelectric Developments on the Pacific Coast." He discussed the necessity for avoiding conflict of irrigation and power interests in water storage. The requirements of irrigation are best served by water stored until the dry season, in low level reservoirs that can be supplied from the entire watershed, whereas power uses are best served by continuous flow from reservoirs in the upper part of the basin where a maximum of head may be developed. Power demand in California has been increasing three to four times as fast as the population. The use of water power has increased there 138 per cent in nine years, or at the rate of approximately 9.9 per cent compounded annually. Adding steam power, the rate becomes 11.1 per cent compounded annually. By 1930 he estimates that the annual energy output will exceed 10,000,000,000 kw-hr.

F. W. Peek, Jr., consulting engineer, General Electric Company, Pittsfield, in his paper on "High Voltage Power Transmission," showed that the ultimate voltage of transmission lines would not be limited by engineering difficulties, but rather by sources and markets for power. In his opinion it will be necessary to have a minimum of 100,000 kw. of power per circuit to be transmitted before 1,000,000-volt transmission will be economically feasible, as the cost of very high voltage lines is such that they can be built only when great amounts of power are to be transmitted. A 1,000,000-volt transmission line, for example, should have tubular conductors 6 in. in diameter, spaced 30 ft. apart on 20-ft. insulators, on towers probably about 200 ft. high. Prof. Harris J. Ryan, Stanford University, presented a paper on "High Voltage Phenomena Encountered in Power Transmission." He agreed with Peek that 100,000 kw. per circuit is the minimum power that can be economically transmitted at 1,000,000 volts. Pictures were presented showing experiments with high voltage in his laboratory at Stanford University.

H. W. Dennis, consulting engineer, Southern California Edison Company, co-author with H. A. Barre, executive engineer, Southern California Edison Company, of a paper entitled "Growth of the Use of Electric Power in Southern California and Probabilities of Its Future Growth with Reference to Sources of Hydraulic Power," said that in the territory served by the Southern California Edison Company the population increased over 300 per cent between 1910 and 1920 and that during that time the company increased its output from 379,900,000 kw-hr., in 1910, to 1,079,000,000 kw-hr. in 1920. Some 550,000 acres of land are irrigated by water pumped with power supplied by his company. An acre of arid land uses 300 kw-hr. yearly, has its sale value increased thereby from $30 an acre to $225 an acre, and yields an annual return of from $50 to $100 an acre in crops. The increase of electric power production in the territory served by this company has been compounded at the rate of 10 per cent per annum. Anticipating a steady increase in power demands for many years to come, a very extensive development program has been laid out. During the next six years 322,000 hp. will be developed and a distribution system provided at a total cost of about $125,000,000. This year, $27,000,000 is being expended by the company for water power plants and additional distribution facilities. The conclusions only were read from the paper presented by C. F. Loweth, chief engineer, Chicago, Milwaukee and St. Paul Railway, on "Hydroelectric Power Development as Related to Electrification of Railroads." These were: That it is reasonably safe to assume that hydroelectric power will be a large factor in steam railway electrification under the following conditions: "(A) When it is available over such an extended area as will include a large main track mileage for the individual railroad under consideration, (B) when the several sources are tied together so as to insure reliability, (C) when it can be contracted for extending over long periods, (D) when its cost reduced to terms of locomotive tractive effort is cheaper than that of steam generated power."

Following the Thursday evening meeting the delegates went by train to inspect the Hetch Hetchy, combined municipal water supply and hydroelectric project of the city of San Francisco. Here an opportunity was afforded to study in detail a typical western development of large proportions. In the present stage of construction, work is under way on a concrete and earth dam, an 18-mile tunnel, forebay, penstock, power house and other construction work incidental to a combined water and power development served by its own 68-mile railroad.

Utah Power Company Is Granted Development Permit

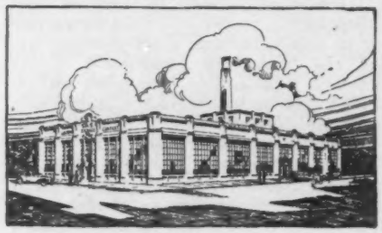
The Utah Power & Light Company, Salt Lake City, Utah, has been granted a license, by the Federal Power Commission, for its Soda site on Bear River, which is located a few miles above the existing Grace plant of the company. A preliminary permit for this site and three other sites on the river was granted to the company on July 19, 1921.

The market for power in Utah has grown so rapidly during the past two years that the company finds it necessary to provide more generating capacity at once. A concrete dam approximately 250 ft. long will be built in Bear River and two hydroelectric generating units of 10,500-hp. capacity each will be installed in the power house, which will be built as an integral part of the dam. The turbines will operate under a head of about 80 ft. The plant will be connected by a 130,000-volt transmission line with the existing transmission system of the company.

Cotton Cordage Mill to Be Built in California

To supply cordage for the insulation of the wire products of the California Wire Company of Orange, Calif., a new industrial organization to be known as the California Cordage Company has been formed by men of that city. The new company's product will be used entirely by the wire company which is closely affiliated with the new cotton-spinning mill.

The building of a structure to be 80 x 150 ft. with an ornate exterior of tile or stucco will be started in the near future. This mill will be situated across the street from the new wire mill of the California Wire Company to facilitate the transportation of the cotton insulating material to the consuming company. The cotton mill will use the cotton waste from the Imperial Cotton Mills of Los Angeles for some of the insulating material to be produced. In addition to the insulating



Architect's drawing of the building to be erected at Orange, Calif., for the California Cotton Cordage Company. Cotton insulating material will be manufactured here for the California Wire Company.

yarns the cotton mill will also manufacture wrapping and sewing twine and cotton rope.

Contracts now held by the California Wire Company will call for a large production of the insulating yarn from the new cotton-spinning mill as it has orders which call for delivery of a carload of finished cables every day. This will require the wire company to run a full shift of workers both day and night.

At present the copper wire, rods and cables are all made in the Anaconda Copper Company's works at Great Falls, Mont. According to the president of the wire company a smelter and wire drawing mill is needed in the vicinity of Los Angeles, to secure the best development of the industry.

The Reedsport Light and Power Company's plant, at Reedsport, Ore., was sold, quite recently and it is expected that all of the equipment that can be used will be put into active operation within the next 60 days, reasonably insuring lights for this fall and winter. Plans for an extension of wires and equipment to fit the whole city are in progress.

The first unit of the Skagit River power development, for the city of Seattle's municipal power program, will be completed by December, 1923, according to the chief engineer, Carl E. F. Uhden. The Skagit River development is to be in two units; the higher one will be the Ruby plant at an elevation of 1,600 ft. and the lower, or Gorge plant, 800 ft. lower.

Railroad Commission Approval Given to Land Deeds

Approval of the California State Railroad Commission of several deeds between the Mount Shasta Power Corporation and the Red River Lumber Company was recently granted. By the conditions of the deeds the Red River Lumber Company is to receive from the power corporation lands and rights along Hat Creek, in addition to two power plants of 25,000-kva. installed capacity. In return the power company is to receive the right to survey at any time within the next five years any lands now owned or hereafter acquired by the lumber company and to choose any lands or rights necessary to the construction and operation of its power plants and transmission lines.

The Red River Lumber Company agrees to lease the two power plants to the power company and to accept as rental, specified amounts of electric power not to exceed 9,500 hp. At the conclusion of the lease the lumber company agrees to pay the Mount Shasta Power Corporation the actual cost of acquiring the lands and in addition the reasonable value of the power plants less $500,000.

University of New Mexico Will Have Illuminated "U"

A large electric sign, forming the letter U, will be the property of the University of Mexico in the near future. The sign will be placed upon the roof of the highest building on the university campus and persons within a radius of 10 miles will be able to see it at night.

The sign was made possible by the gifts of citizens of Albuquerque, N. M. Arthur Prager of the Gas and Electric Company and Dr. N. K. Wylder were the leaders in the movement to secure the sign.

Engineer Recommends Enlarging of Morena Spillway

That the spillway of the Morena dam of the city of San Diego should be enlarged, is the opinion of J. B. Lippincott, consulting engineer of Los Angeles. According to his report the present spillway is unsafe as the dam is of a rock fill type, and he recommends a spillway of 285-ft. length.

If this construction is made it will be sufficient to withstand a flood equal to 150 per cent of that of 1916, leaving a free board above the maximum water level in the reservoir to the top of the dam of 3.3 ft.

A recent tour of investigation by Roy L. Carberry, chief engineer and general manager of the Imperial Irrigation District, showed that the Pescadero Dam and cut have actually diverted the Colorado River overflow entirely away from the Imperial Valley. A channel is rapidly forming and lowering itself into the ground. The overflow at 5 miles below the dam is in a direction opposite to that of Volcano Lake, showing that the general course is away from and not toward the Imperial Valley. There is evidence, too, that the Volcano Lake country can drain off and become absolutely dry.

Books and Bulletins

STANDARD HANDBOOK FOR ELECTRICAL ENGINEERS

FRANK F. FOWLE, editor-in-chief. Fifth edition. 25 thumb-indexed sections. 4 by 7 in. 2,139 pages. Illustrated. $6. McGraw-Hill Book Co., Inc., New York.

Last revised in 1915, the new edition of the Standard Handbook has been fully reviewed by its editors, to include all of the developments in electrical engineering practice which have been evolved during the period of industrial activity brought about by the war. Many of the sections have been entirely rewritten and all have been brought up to date. One of the chief features of the new edition is the enlarging of the index to the point where that section is more comprehensive and the contents of the book more accessible. With its many additions and revisions, the book surpasses the high standards which it has set in the past as an indispensable reference work for engineers.

HOW TO RETAIL RADIO

By the Editors of Electrical Merchandising. 5½ by 8 in. 226 pages. Illustrated. $2. McGraw-Hill Book Co., Inc., New York.

The almost over-night growth in the popularity of radio has opened a new field of profit for the dealer, whether he deal in radio material alone or whether he has installed a radio department in his store. Many dealers have been attracted to the field who will not survive. This book has been designed to help the merchant who feels that radio has come to stay. Every conceivable angle of merchandising practice which will enable a dealer to conduct a successful radio business has been considered in some one of the chapters. The subjects covered include financing, store location, equipment and store arrangement, getting customers, advertising, displaying goods, training salesmen, demonstrations, installation and servicing, business records, overhead and many other pertinent ideas. The book should prove of exceptional value to the dealer who is contemplating the installation of a radio department or to the one who would see his radio department grow.

NEW ELECTRIC HANDBOOK

The Electric Power Club, Cleveland, has issued a new edition of its handbook, covering substantially all the standardization it has effected in the electric motors, motor pulleys, generators, transformers, electric tools, mining and industrial locomotives, control equipment, power switchboards and switching equipment manufactured in this country.

The Hydraulic Society has gotten out a second edition of its pamphlet entitled "Trade Standards in the Pump Industry." This edition contains some additional tables and explanatory data, and also a revised list of members of the Society. Copies may be secured from the members or the secretary, C. H. Rohrbach, 50 Church Street, New York.

MEETINGS

Development Society Fosters Successful Conference

Called by the Society for Electrical Development, Inc., the conference of local Electrical Leagues recently held at Association Island, N. Y., was a great success and much good was derived by the men of the electrical industry who attended. Over 120 delegates were present representing about thirty leagues and over forty cities. The Joint Committee for Business Development worked in conjunction with the Society in arranging the meeting, which laid plans for carrying out the valued work of the local leagues and of establishing these leagues in still other localities.

This is the second cooperation meeting of electrical men at the island, the first being held in 1913 when the Society for Electrical Development was formed. At that convention, however, only executives were present, while this last one was attended by men of the industry who were actually doing the electrical work throughout the country.

The meeting was conducted upon open forum lines, no prearranged schedule being worked out. Discussion was fostered and nearly every man present had some idea to present to the conference.

The following resolution was proposed and unanimously adopted by the conference:

Whereas: The Society for Electrical Development, finding the need of a medium through which, by spoken word, messages of moment to the industry, may be quickly transmitted to substantial groups of men in the larger centers of population and through them to the smaller communities; and

Whereas: The lack of such a medium at this time in promoting the work of the Joint Committee for Business Development, to which the Society for Electrical Development has pledged its support, is particularly evident; and

Whereas: While Electrical Leagues and Clubs have existed for some time in certain cities of the country, their efforts have never been coordinated or influence used in support of matters of national significance to the industry, and that this is the first meeting of representatives of leagues and clubs ever held; and

Whereas: Out of the interchange of ideas and experiences made possible by this gathering, we have gained knowledge as to our limitations as well as opportunities for greater service; We

First: Congratulate the Society for Electrical Development on its foresight in calling together for conference and exchange of experiences, representatives of Electrical Leagues and Clubs throughout the country;

Second: While recognizing the limitations of the leagues and clubs for all purposes, that for the purpose in mind no better medium has yet been created or is contemplated and therefore these should be used;

Third: That leagues should be established and their work fostered in every community large enough to support one;

Fourth: That for this purpose organized effort is needed and should be supplied by the Society for Electrical Development;

Fifth: That the Society for Electrical Development use its best efforts in directing the attention and securing the support of leading men in all branches of the industry in establishing these leagues;

Sixth: We pledge our support, first: in strengthening and broadening the usefulness of the leagues we represent; second, in helping to establish similar leagues in other cities; third, in giving hearty and continued support to the Joint Committee for Business Development.

British Columbia to Have New Pulp and Paper Mill

Work is starting immediately on a large pulp and paper mill for the Wigwam Pulp and Paper Company at Phillips Bridge, nine miles south of Elko in the East Kootenay district, British Columbia. The first unit is costing $3,500,000 and will have a capacity of 100 tons of paper a day. Ultimately the plant will represent an expenditure of $10,000,000 and employ 1,500 men.

The contract for the construction work has been let to McDougall & McNeill, Limited, of Vancouver. C. D. McNab, Waldo, B. C., of the Baker Lumber Company, has obtained the contract for supplying the pulpwood of which there is said to be a supply sufficient for 30 years.

The Wigwam Pulp and Paper Company represents both Canadian and American capital. Among the American newspapers interested are the Chicago Tribune and the New York Daily News. Electric power generated in the vicinity will be used.

Sperry Flour Company Acquires Large Portland Mill

Operation of the $10,000,000 property of the Portland Flouring Mills Company has been taken over by the Sperry Flour Company and formal announcement of the transfer of the property is expected to follow within a few days.

This is the largest transaction in the history of the flour mill business on the Pacific Coast. This means the combination of two of the largest milling companies west of the Mississippi River with combined assets in excess of $30,000,000, and a combined milling capacity of 27,000 bbl. of flour per day.

COMING EVENTS

COLORADO RIVER COMMISSION
Special Meeting—Santa Fe, N. M.—Nov. 9, 1922

NATIONAL ASSOCIATION OF RAILWAY AND UTILITY COMMISSIONERS
Annual Convention—Detroit, Mich.—Nov. 14, 1922

ELECTRICAL SUPPLY JOBBERS' ASSOCIATION
Annual Convention—Cleveland, Ohio—Nov. 20-24, 1922

Commission Grants Permit For Power Development

Permits covering two power developments in California have recently been granted by the Federal Power Commission of Washington, D. C. The California Oregon Power Company was granted a preliminary permit for a project on the Klamath River near the northern border of the state which is planned to develop 120,000 hp. Since this project will utilize water from the same sources as certain irrigation projects the commission has reserved the right to impose "whatever restriction on diversion of water as may be in the public interest."

The commission has also authorized the Little Rock Power & Water Company to proceed with its development of Little Rock creek in southern California. This project will produce 2,300 hp.

Permits covering extension projects in Alaska were also granted. The companies receiving the permits are the Sawtooth Power Company on the Kruzgamepa River, and the Willow Creek Mines on Craigie creek.

Associated Contractors to Hold Convention in Los Angeles

The next national convention of the Associated General Contractors of America is coming to Los Angeles. A referendum to the members disclosed an overwhelming sentiment in favor of the Pacific Coast city. What was apparently the only obstacle was an insistence that all the delegates and the convention should be housed in the same hotel. Due to the persistence and activity of Brook Hawkins, this obstacle was removed by an offer from the management of the Clark Hotel to reserve rooms for 400 and provide an assembly hall and committee rooms. President Arthur S. Bent of the national association believes the bringing of a convention to the Pacific Coast will be of incalculable benefit to the organization as it will permanently nationalize it in the minds of the members and the public.

News of the definite selection of Los Angeles as the convention city came in a recent telegram to President Bent. The convention will be held about the third week in January.

Clackamas River Project Will Be Started Immediately

Work on the new $6,000,000 hydroelectric project of the Portland Railway Light & Power Co., the contract for which was recently awarded to the Hurley-Mason Co. of Portland, will be begun immediately, according to G. C. Mason, vice-president of the company.

The dam will be on the Oak Grove branch of the Clackamas River, 30 mi. beyond Cazadero, where the company's present dam is located. The dam will be of concrete and will probably be of the gravity type. The new plant is expected to be in operation by July, 1924.

The saxaphone band of the Denver Gas & Electric Light Co., which made its debut to the public during the recent music festical in Denver, has broadened its activities and is providing musical programs at the various city parks on Sunday afternoons.

Personals

John H. Anderton, of the firm of Thebo, Starr and Anderton, consulting engineers of San Francisco, has recently returned from Japan, where he has spent several years in supervising hydroelectric development on the Kiso Gawa River in the heart of the Japanese Alps for the Daido Electric Company. Mr. Anderton recently gave a

JOHN H. ANDERTON

talk on hydroelectric development in Japan before the San Francisco Electrical Development League in which he told of the unique methods employed in that country. He pointed out that storage reservoirs are impossible because of the heavy floods and the debris which is carried by the Japanese rivers. Mr. Anderton was formerly chief electrical engineer for the Stone & Webster interests and as such was prominently identified with the Caribou development of the Great Western Power Company. During the war he was engineer in charge of electric welding at the Hog Island shipyards in Pennsylvania.

R. H. Manahan, city electrician of Los Angeles, has recently returned from the national convention of city electricians held at New Bedford, Mass. During his absence, Mr. Manahan visited New York, Cleveland, Chicago, Buffalo. Boston, and other large cities investigating fire alarm and street lighting conditions.

Henry Bostwick, San Francisco manager of the Pacific Gas & Electric Company, and well known to members of the electrical industry throughout the West, has just completed a most successful convention of the Pacific Coast Gas Association at Santa Barbara, over whose sessions he presided as president.

W. A. Brackenridge, senior vice-president of the Southern California Edison Company of Los Angeles, is a recent San Francisco visitor.

C. E. Skinner, assistant director of engineering, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., is spending a few weeks in Los Angeles and southern California looking over the field in the interests of the engineering department of his company. Mr. Skinner came to California from the Pacific Northwest where he delivered several lectures before electrical organizations in that vicinity.

A. E. Baron, formerly assistant to the comptroller, San Joaquin Light & Power Corporation, is now connected with the Southern California Edison Company's stock sales department. Mr. Baron has just been made chairman of the program and entertainment committee of the Los Angeles Electric Club, succeeding **H. W. Allen**, resigned.

Ralf R. Woolley, hydraulic engineer of the United States Geological Survey with offices in Salt Lake City, has returned after several weeks spent in surveying the Green River between the cities of Green River, Wyo., and Green River, Utah. He was accompanied by **K. W. Trimble**, topographical engineer of the geological survey, **J. B. Rewside**, geologist, and **H. L. Stoner** of the Utah Power & Light Company. The party traveled down the river a distance of 400 miles.

E. H. Eardley, of the Eardley Electric Company of Salt Lake City, chairman of the contractor-dealers' association of that city and chairman of the Engineers' Committee of the National Association of Electrical Contractors and Dealers, gave a paper on "Specific Specifications" before the recent convention of that organization at Cincinnati.

H. H. Walker, president of the Electrical Contractors and Dealers' Association of Los Angeles, and one of the leading electrical contractors of southern California, has just been appointed representative on the Advisory Committee of the California Electrical Cooperative Campaign by the Southern District, California State Association of Electrical Contractors and Dealers.

W. R. B. Wilcox, for 16 years practicing architect in Seattle, has accepted the appointment of professor of architecture at the University of Oregon at Eugene. Mr. Wilcox has been vice-president of the American Institute of Architects, and served on many architectural juries, as well as being a member of the city plan commission of Seattle.

Richard L. Humphreys, civil engineer of Philadelphia, one of those attending the recent convention of the American Society of Civil Engineers in San Francisco, has declared that California will be the scene of the highest development of hydroelectric power in the world during the next decade. Mr. Humphreys made the statement after visiting some of the existing developments.

W. P. L'Hommedieu has been made manager of the newly formed central station division of the Westinghouse Electric & Manufacturing Company's San Francisco office. The railway division at that office has been changed to the transportation division and **E. A. Palmer** appointed as manager. **H. L. Garbutt** has been made manager of the newly organized merchandising division.

Theodore Varney, electrical engineer of Pittsburg, Pa., recently completed an extensive inspection of some of the important hydroelectric developments of California.

G. W. DeSellem recently arrived in Portland from Pittsburg, Penn. He will be attached to the sales force of the Portland office of the Westinghouse Electric & Manufacturing Company, spending most of his time for the present in the city and immediate vicinity. **W. S. Boutwell** has been transferred from the Seattle to the Portland district where he will be the service department representative, covering the state of Oregon.

K. E. Van Kuran, Los Angeles district manager of the Westinghouse Electric & Manufacturing Company, has just recently left Chicago to attend the American Electric Railway Association's convention. From there, Mr. Van Kuran will proceed to the works of the Westinghouse Company at East Pittsburgh, before returning to Los Angeles.

H. C. Spoden, formerly of Chicago, and more recently with Electric Lighting Supply Company and Pacific States Electric Company of Los Angeles, is now assisting E. P. Markee, district manager of the Edison Lamp Works of the General Electric Company.

C. P. Soderberg, formerly with the Cleveland Wire and Cable Company of Cleveland, Ohio, is now connected with the Westinghouse Electric & Manufacturing Company's Los Angeles office as assistant specialist on safety switches and illuminating equipment.

John R. Freeman, noted civil engineer of Providence, R. I., well known in the West for his work in connection with many irrigation, water and power projects, presided over the recent meeting of the American Society of Civil Engineers in San Francisco, at which water power and water power development were the chief topics of discussion. Mr. Freeman was the engineer who visualized the Hetch Hetchy system of the city of San Francisco, now under construction. He was also identified

JOHN R. FREEMAN

with the Great Western Power Company's Feather River developments and some of the projects of the Pacific Gas & Electric Company. During the war he was a member of the advisory committee on aeronautics. Recently he completed a commission for the Chinese government relative to the rehabilitation of the Grand canal and the control of the waters of the Yellow River.

Frank E. Webb, construction engineer of New York, is making a study of the problem of bridging San Francisco Bay. He is representing a number of eastern engineers and capitalists in proposing to erect a toll bridge across the lower portion of the bay.

C. Opitz, formerly district agent for the Puget Sound Power and Light Company at Benton, Wash., has resigned to become district agent for the Olympic Power Company at Port Angeles, Wash. **L. P. Heath** has been appointed to the vacancy at Renton.

C. L. Hill is succeeded by **Ben F. Dupuy,** as city engineer of Glendale. Mr. Hill resigned last week to engage in private engineering practice and refused to reconsider his decision after being offered a substantial increase in salary by the Glendale city council, which joined with City Manager Reeves in paying tribute to Mr. Hill's services to that city. Mr. Dupuy has been city engineer at Fullerton, prior to which he was city engineer for Long Beach.

C. C. Finn, Northwest manager of the Finn Metal Works, San Francisco, was recently honor guest and principal speaker at the weekly meeting of the Seattle Electrical Club. Mr. Finn spoke on "Bearings and Babbitt."

D. W. Henderson, general superintendent of the Seattle municipal railways, is in Salt Lake City, as an expert witness before the state industrial commission of Utah, regarding the operation of one-man cars.

P. H. Booth, sales manager of the Edison Electric Appliance Company at the Ontario, Calif., factory, has just returned from an eastern trip during which he represented the Los Angeles Electric Club and the California Electrical Cooperative Campaign at the convention of local electrical leagues at Association Island. **R. A. Balzari,** of the San Francisco office of the Westinghouse Electric & Manufacturing Company, represented the San Francisco Electrical Development League and the Cooperative Campaign at the meeting. The sessions, sponsored by the Society for Electrical Development, Inc., brought out many points of interest to the electrical cooperative movement and resulted in the passage of a resolution declaring for the formation of such organizations in every community capable of supporting one.

P. H. BOOTH

E. V. Peterson has been appointed manager of the recently organized merchandising division of the Seattle office of the Westinghouse Electric and Manufacturing Company.

H. D. Hawks, general sales manager of the rolling mills department of the Anaconda Copper Mining Company, is a recent San Francisco and Los Angeles visitor. Mr. Hawks is making an extensive business trip throughout the entire Pacific Coast region.

W. E. Ringwood, for the past sixteen years with the firm of Harron, Rickard and McCone of San Francisco, has resigned to become vice-president of the Eccles and Smith Company of San Francisco and Los Angeles.

Lewis G. Carpenter, hydraulic engineer, **H. I. Reid,** civil engineer, **O. F. Lackey,** vice-president of the Colorado Springs Light, Heat & Power Company, and **D. K. Kennedy,** general superintendent of the same company, recently completed a tour of investigation of the Pikes Peak region for the purpose of making a survey of power possibilities.

W. S. Murray, chairman of the Super Power Committee survey on the Atlantic Coast, is a recent Pacific Coast visitor. Mr. Murray, it will be recalled, made an exhaustive report for the National Electric Light Association on the Hydro Electric Power Commission of Ontario, Canada. He will spend some weeks in California.

J. P. Pulliam, of Milwaukee, Wis., president of the Eastern Oregon Light and Power Company, of Baker, recently made his annual tour of inspection over the company's properties. General Manager, J. P. Lottridge, accompanied Mr. Pulliam.

W. S. Rugg, assistant to the vice-president, has been appointed general manager of sales of the Westinghouse Electric & Manufacturing Company. The appointment, which was announced by Vice-president H. D. Shute, takes effect immediately.

R. R. Roblev. operating engineer of the Portland Railway Light & Power Company, has been attending the meetings of the National Technical Committee of the N.E.L.A. at Milwaukee, Wis., which were in session September 18 to 21 inclusive. Mr. Robley will consult with the engineers of the General Electric Company at Schenectady on company matters and will then spend a few days in New York City before starting on the return trip.

Jerry Barth, formerly owner of the West Sixth Street Electric Company and more recently connected with the McMillan Electric Company, is now connected with the Edison Mazda Lamp Department of the Pacific States Electric Company, Los Angeles, assisting **W. R. Edwards,** manager of that department.

H. K. Winterer, industrial control specialist of the General Electric Company's Los Angeles office, has recently left for their factory at Schenectady to study the latest developments in industrial control apparatus and will be gone for about two months.

H. Alex Hibbard, in the interests of cooperative development of the Denver Association of Electrical Contractors and Dealers, has accepted the office of secretary of that organization, although he himself is a manufacturers' agent.

J. F. Dostal, the newly elected president of the Rocky Mountain division of the N. E. L. A., has been prominently identified with organized effort in the electrical industry since his graduation from Purdue University in 1902. He entered the engineering department of the old Denver Gas and Electric Company the same year and after several years in charge of distribution became the electrical superintendent. He went to Colorado Springs in 1911 as general manager of the Colorado Light, Heat and Power Company, of the central station in that city, and is still the incumbent of that position. He served one term as president of the Colorado Public Service Association and for two years was secretary and treasurer. From 1908-11 he held high offices in the national Jovian order. He is a member of the Rocky Mountain Committee on Public Utility Information and is also prominent in the affairs of the Rotary and Engineers' clubs of Colorado Springs.

J. F. DOSTAL

Edward H. Sharpe, formerly special representative of the executive department of the Pacific Electric Railway, of Los Angeles, has just recently severed his connection with that company and is now in charge of the publicity activities of the Victor-Girard Company.

Edward C. Thomas, formerly general agent in charge of advertising the Pacific Electric Railway Company, of Los Angeles, has been appointed special representative of the executive department, and will assume his new duties immediately upon his return from Chicago where he is now attending the annual convention of the American Electric Railway Association.

R. E. Fisher, vice-president of the Pacific Gas & Electric Company and chairman of the Advisory Committee of the California Electrical Cooperative Campaign, and the following members of the Advisory Committee, were all in Los Angeles for a meeting of that Committee on October 6th; **Garnett Young,** Garnett Young & Co.; **W. S. Berry,** sales manager, Western Electric Company; **Clyde L. Chamblin; C. C. Courtright; Robt. L. Eltringham,** all of San Francisco, and **Geo. T. Bigelow,** of Southern Sierras Power Company, Riverside.

The Roller-Smith Company, New York, has just issued Bulletin No. 250, which describes its portable d.c. galvanometers, types LGD and KGD. These two galvanometers were designed particularly for educational institutions and laboratories. A full description of each type of galvanometer is contained in the folder.

N. R. Crooks and **Richard Nathan,** formerly doing a retail business in Denver as the Crooks-Nathan Household Appliance Co., have established their new headquarters at 305 Commonwealth Building in that city. They will distribute several lines of appliances and other non-electric household necessities and will also serve as manufacturer's representatives.

George Richards & Company, Chicago, has recently made an addition to the present Hemco Line of plugs, made up of the Hemco Twin-Lite and Hemco Tach-Lite plugs. This new item is called the Hemco Trip-Lite plug. It has three outlets, all of which are threaded so that the Uno type of shade holder can screw directly on the threads. The clamp type of shade holders fasten over the threaded ends of the plugs.

The Steel City Electric Company, Pittsburgh, has just issued its Distributor's Discount Sheet No. 217, which cancels sheet No. 216.

Hobart Brothers, Troy, Ohio, have issued Bulletin No. 78H which contains a description of the constant potential charging outfits made by the company.

The Whitney Electric Co. in Colorado Springs, Colo., has added a radio department to its business and is boosting a movement in that city to provide local broadcasting facilities.

The Arthur-Fowler Company, manufacturers of electric water heaters and accessories of Spokane, has produced a new tank cover for domestic range boilers. This will supplement its line of flexible laced covers, being particularly adapted for districts where the cost of current for water heating is higher and insulation of the highest efficiency necessary. The new cover is called "Enamet" and consists of three-inch insulation built into an outer metal shell finished in white enamel. Recent cooling tests on a 40-gal. tank covered with an Enamet gave a temperature of 112 deg. F. 72 hours after the current was cut off.

The Westinghouse Electric & Manufacturing Company has issued a new price list for its electric ware and ranges. This new list is for its catalogs No. 8C and 8D.

The F. W. Wakefield Brass Company, of Vermilion, Ohio, has announced an accessory line of "Red Spot" hangers and brackets for commercial lighting. These units supplement the regular "Red Spot" line and are intended for lighting of hallways, rest rooms, closets, etc. They include a ceiling type fixture, one of the suspension type. and two wall brackets, one upright and one pendant, all of the same standard construction as regular "Red Spot" hangers.

The Moe-Bridges Company, Milwaukee, Wis., has just issued a new 65-page catalog. which illustrates its line of electrical fixtures. This can be obtained by writing either its San Francisco branch or the home office.

Manufacturer, Dealer, and Jobber Activities

The National X-Ray Reflector Company, of Chicago, has published its Bulletin No. 360 which gives detailed description of color lighting in show windows by use of the gelatin color slides manufactured by that company. The folder describes the effects that may be secured with the color-ray slides. This company also has published bulletins No. 347 and 391 which describe the X-Ray Curtis Adapter and the X-Ray Eye Comfort Luminaire manufactured by it for home use.

The Electric Waffle Iron Company, New York, has recently placed on the market the "Yum Yum" line of electric waffle irons. These are in several different sizes, being both for commercial and domestic use. **Gardiner Brothers** of San Francisco are the western repcrecentatives of the manufacturing company.

The General Electric Company has issued Bulletin 46108 describing the Type M-4 Demand Meter which is manufactured by the company and designed for use in combination with a watthour meter to indicate maximum demand. It is of the so-called "block interval" type indicating the maximum demand integrated and averaged over a definite time interval. The windings of the M-4 demand meters are adapted for a maximum of 240 volts and can be furnished self-contained for use on all standard frequencies. For operation on higher voltages such as 440 or 550 a small transformer, Type V-3, is furnished to provide a source of 110 volts for the motor and operating coil. Standard time intervals are 15, 30 and 60 minutes. This meter is not recommended for intervals of less than 15 minutes.

Garland-Affolter Company of San Francisco has recently been appointed agent for the Jeffery DeWitt line of insulators in the state of California.

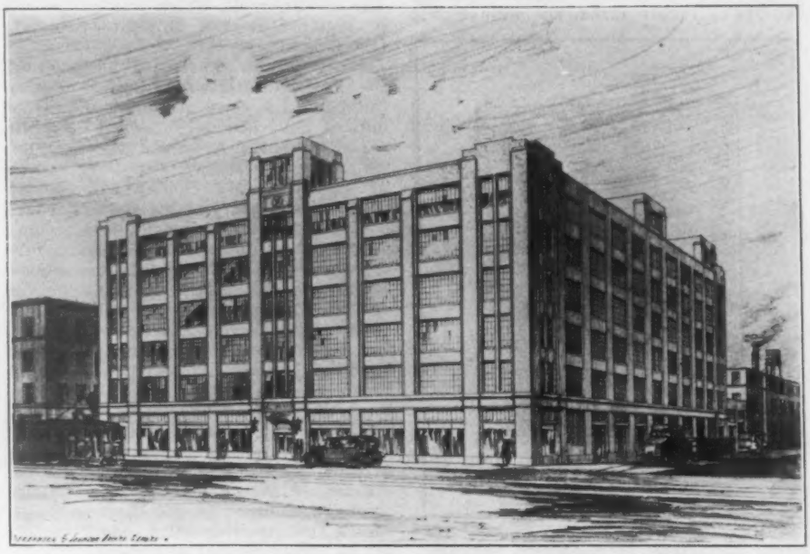
The Illinois Electric Porcelain Company, Macomb, Ill., announces that it is now manufacturing high tension line insulators on a greater scale than heretofore. Additional equipment has been installed to enable the company to maintain its standard of quality. A new catalog is in process and can be obtained directly from the company.

The Trumbull Electric Manufacturing Company of Plainville, Conn., has recently issued and distributed Bulletin No. 4 which gives descriptions of the company's line of safety and externally operated switches. The bulletin is divided into four sections, the different classes of switches being grouped in separate sections.

The National Metal Moulding Company, Pittsburgh, Pa., has recently issued Catalog No. 250 which gives prices, sizes and description of boxes, covers and other items manufactured by the company. All similar items are grouped together in the catalog regardless of the size.

The Magnavox Company, of Oakland, Calif., has completed the new addition to its plant and is now moving into it. Thirty-two thousand sq. ft. of floor space will be added in this way. The company has 300 hp. of electrical equipment at the present time.

The Sprague Electric Works of the **General Electric Company,** New York, has recently published Bulletin No. 68912 which describes the Sprague Electric Type WX Hoist. This hoist is a worm drive, with ½ and 1-ton capacity.



WESTINGHOUSE HAS NEW HOME IN LOS ANGELES

The Westinghouse Electric & Manufacturing Company has just recently moved its Los Angeles offices from the Van Nuys Building to its magnificent new home at 4th and San Pedro Streets. It has a 6-story, class A building of reinforced concrete with offices and salesroom on the sixth floor. The ground and second floors are given over to the warehouse and service departments so that this will enable this company to render more efficient service to its customers in the future. The intervening floors will be leased for manufacturing purposes. The building has a total area of 207,000 sq. ft. and is equipped with its own substation, having a capacity of 650 kva. There are also fire alarm and sprinkler systems. The company has 275 employees in its Los Angeles sales and shop organization.

TRADE OUTLOOK

SAN FRANCISCO

During Market Week in San Francisco 1,000 out-of-town buyers were registered in the city. Large sales were reported by all jobbers throughout the week. The Industrial Exposition now in progress has aroused considerable comment and should encourage buying and development in general.

Unsettled conditions following the recent strikes are being removed and the rehabilitation and new building enterprises of the railroads will furnish an increased demand for workers. Building continues fairly strong and several new real estate additions have been opened. East Bay realtors displayed twelve furnished and electrically equipped homes to many interested prospects during their campaigns.

Port business is growing, with coastwise ships and those en route to the Orient and Southwest carrying capacity cargoes. Machinery, electrical goods, cereals, photographic goods, chemicals and dry goods made up the most of the cargoes.

The Investment Banker's Convention at Del Monte, Calif., has enabled the local men to acquaint the visitors with the larger hydroelectric developments in northern California and as a result a firmer belief in securities behind these enterprises will undoubtedly result.

Record shipments of fruit have been made by growers and received by canneries, but there has been a shortage of refrigerator cars which caused serious damage to grape growers.

SEATTLE

The Pacific Northwest is being seriously handicapped by a car shortage more acute than has been experienced for several years, according to railroad men, lumber and shingle manufacturers, and other shippers. Added to the present shortage is the growing demand for cars arising from the opening of the apple shipping season, and increased demands for cars for grain and hay in the farming districts. A large number of shingle mills have been forced to close because of lack of cars, and a number of mills away from tidewater and with limited storage facilities, have had to suspend operations. The State Department of Public Works, declaring an emergency to exist, has decided to reestablish much the same supervision as was exercised during the war.

The month of September made a good showing in new building work in the city, with a toal of more than $1,250,000 in permits issued during the month. A feature of the month's activities was the large number of residences contracted for. Electrical jobbers report that the month was particularly satisfactory in their line, due to the heavy demand for home fixtures. The Electrical Home exhibits, viewed by an exceptionally large number of people, are expected to greatly stimulate interest in electrical equipment in the home, and contractors report that many inquiries regarding this line have been made by prospective home builders.

Business among electrical jobbers and contractors is reported very satisfactory for the month of September and first week in October.

The usual fall demand for lamps is beginning to materialize strongly, very largely from residence demand.

LOS ANGELES

Building activities in Los Angeles during the month of September reached the huge sum of $10,267,894 with 4275 permits issued during this period. This represents an increase of 25 per cent over the same period a year ago. During the month of August, Los Angeles ranked fourth throughout the United States. Bank clearings for the last fifteen days of September amounted to $224,000,000.54 which is an increase over the corresponding period of last year of approximately 25 per cent with a total of $182,223,662.21.

Abundant crops have injected a new stimulus into business, and the realization that prosperity is just ahead is causing new buying from retail consumers, which in turn is affording manufacturers and wholesalers unusual opportunities. Despite the car shortage owing to the recent rail strike, it is expected the citrus crop will be moved on schedule. Buying continues active and this is especially true in the purchase of electrical apparatus as regards the sale of large and small appliances and also in supply lines. With the advent of fall, retail buying is picking up.

PORTLAND

The general tone of business in and around Portland is very encouraging. The condition of the principle manufacturing industry, lumber, is about normal. Lumber prices remain firm with a slight upward tendency. The wool industry is also about normal. Grain and fruit crops are somewhat less than expected and have curtailed rural buying slightly. Water borne commerce from the port of Portland for the first nine months of the year is far above any previous records, with lumber, grain and wool as principal exports. Nearly half the lumber manufactured in this vicinity is now shipped by water.

Building activity in Portland this year will break all former records. The permits for the first nine months total $18,544,330 as compared with $20,886,202, for twelve months in 1910, the largest year. With the coming of wet weather, building operations are expected to slow up, though there is also a tendency toward more industrial construction.

Bank clearings and postal receipts show a considerable increase over September, 1921. Prices in electrical lines are very stable and stocks generally are in good shape. Central station generation in Portland recently passed all former records for twenty-four hour generation and now exceeds last year by 20 per cent.

DENVER

Bank clearings as a barometer of business indicate clearly the volume of business done in a community. Clearings of Denver banks for September totaled $131,959,358, an increase of $3,546,791 over the same period in 1921. Moreover figures just compiled on national bank reports show an average deposit of $669 per capita, the highest figure in the history of local banking circles.

Similar optimism is reflected in the building program. With almost three months of the year remaining, the amount of building authorized already exceeds by $1,064,281, the total amount authorized in 1890, the record breaking year up to 1922. During the first four days of October, 93 permits involving an expenditure of $276,200 were issued.

Wiring supplies as a consequence are moving rapidly. Wire, rubber covered and copper, conduit, porcelain, and fittings lead the market. Transmission materials and pole line hardware are in demand outside the bigger cities. Power apparatus is loosening up but appliance sales are still dull. All jobbers report increases—two of them record months.

SALT LAKE CITY

The most important event in financial circles during the past few weeks was the consolidation of the National Bank of the Republic and the Continental National bank, in Salt Lake City, under the name of the latter bank, effective October 2. The new institution begins business iwth a capitalization of $600,000, a surplus of $100,000, and total resources of approximately $10,000,000. A new eighteen-story building will ultimately house the new bank, the work on which will be under way within a few weeks.

Mining conditions continue to be very satisfactory. The Utah Copper company at Bingham, Utah, has thirteen steam shovels at work, and is shipping an average of 17,000 tons of ore daily to the mill at Garfield.

With the new high tariff, the sugar industry is being restored to a more profitable basis, and within a few years the plants should return a revenue large enough to overcome the deficits suffered in 1920 and 1921. The fall sugar-making campaign is now on, which means the distribution of large sums of money among the beet-growers, and the employment of a large number of people by the sugar companies.

Crop conditions appear to be good, with the fall harvesting well under way.

The electrical interests expect to derive considerable benefit, in the way of increased sales of appliances, and a general increase in the use of electricity, as a result of the electrical exposition which has just come to a successful close in Salt Lake City.

CONSTRUCTION NEWS

Calif., San Francisco — Apartments — James Welsh, owner, is planning to erect a modern six-story and basement concrete apartment house on his property at the northeast corner of Taylor and Derby Place. The building will contain 33 apartments and will cost approximately $70,000.

Calif., San Francisco—Apartments—S. and G. Gump have been granted a permit to erect a six-story brick apartment building on the southwest corner of Geary and Jones Streets; estimated cost, $85,000.

Calif., Sacramento — Office-Warehouse — The Crane Company is planning the erection of a building at Front and M Streets to cost approximately $136,000.

Calif., San Francisco — Apartments — C. S. Grillo, of the Standard Investment Company, will build an apartment house on the south side of O'Farrell Street, between Hyde and Polk, to cost $120,000. Wm. Beasley, architect, is planning a number of electric innovations in the structure.

Calif., Van Nuys—Business Block—R. R. Edwards is planning the erection of a brick business block on Sherman Way between Erwin and Delano, adjoining his present building. R. J. Baird is also planning to erect a one-story building on East Friar Street to be occupied by the Van Nuys Nursery Company as a sales room. R. R. Edwards Building Company will construct both of these buildings.

Calif., Arbuckle—School—Work has been commenced on the $70,000 Arbuckle Union High School building, which is expected to be finished for occupancy by Jan. 1, 1923. Herndan and Finnegan, Sacramento, have the contract. Jens. C. Peterson, Sacramento, designed the building. The structure is to be of brick with a tile roof. It will include six class rooms, an auditorium with a seating capacity of 500 persons, a stage and two dressing rooms, a principal's office, teachers' room, library and kitchen.

Calif., Folsom—School—The contract for the erection of a manual training building at the Folsom Grammar school has been awarded to H. A. Hendren of Fairoaks. The building will be a stucco finish, wooden structure.

Calif., Colusa—School—The proposal to bond county for $250,000 for a county High School to be located in Colusa failed to carry at a recent election.

Calif., Los Angeles—Lodge—The Odd Fellows of Los Angeles have completed arrangements for the construction of a modern three-story and basement Class "A" building on its property at Twelfth and Flower Streets, to cost approximately $250,000. Morgan, Walls & Morgan, architects, have prepared plans for the building.

Calif., Redding—School—The trustees of the Redding school district have let the contracts for the new grammar school building for $97,000 to Herndon & Finnegan, for general construction work, Woods Bros., electrical work, and Lupen, Hawley & Thing, plumbing and heating apparatus.

Calif., San Francisco—Office and Stores—H. & W. Pierce Company is planning the erection of a three-story and basement reinforced concrete store and office building on the south side of Sacramento west of Front street. Cost is estimated at $70,000. B. G. McDougal is the architect and the Lindgren Company, contractor.

Calif., Chico—School—Polk & Evans of Chico have been awarded contract for building the new Shasta Union Grammar School on a bid of $34,400.

Calif., San Francisco—Apartments—G. F. Barnard, owner, will erect a two-story and basement frame apartment house on the northwest corner of Cole and Parnassus, to cost approximately $43,000. Theo. W. Lenzen, 760 Humboldt Bank Building is the architect.

Calif., San Luis Obispo—Hotel—J. L. Anderson, of this city, has commissioned C. A. Meusforffer, San Francisco architect, to prepare plans for a five-story concrete hotel building at Monterey and Morro Streets. The building will contain 94 rooms with bath, six stores, a grill and spacious lobby and will cost approximately $175,000.

Calif., Sacramento—Printing Plant—Davison & Nicolsen have been awarded the contract for the construction of the proposed new state printing plant on a site at 11th and O Streets, on a bid of $94,800. The building will be of reinforced concrete construction and will consist of two stories and basement. George B. McDougall is state architect.

Calif., Fresno—School — Preliminary sketches are being prepared by Swartz and Ryland, architects, Fresno, for $150,000 additions to the Tulare Union High School buildings, which will include physical education buildings, with gymnasium, manual art buildings and six additional classrooms.

Calif., Live Oak—School—Contract for the construction of the Live Oak grammar School, for which $45,000 in bonds were voted last May, has been awarded to the Campbell Construction Company of Sacramento. W. H. Weeks, of San Francisco, is the architect.

Calif., Sacramento—State Buildings—Excavations have been completed and construction work started on state buildings to occupy two blocks across the street from the Capitol building. The new buildings will cost approximately $3,000,000.

Calif., San Francisco—Schools-Home — At an election to be held on Nov. 21, the proposed $12,000,000 school bond issue will be placed before the voters. A proposed bond issue of $2,000,000 for the erection of a relief home will be voted upon at the same time.

Calif., El Monte—School—Bonds to the amount of $65,000 for providing a site and building for a new grammar school were recently approved at an election here.

Calif., Los Angeles—Store—Preliminary plans for a six-story department store building to be erected at Vine Street and Hollywood Boulevard for Dr. O. F. Palmer are being prepared by Charles F. Plummer, architect. The building will be occupied by Broadway Bros., of Pasadena, and will cost approximately $400,000.

Calif., Los Angeles—Auditorium—Los Angeles Excavating Company, Douglas Building, has been awarded a contract at about $40,000 for excavating at Jefferson and Royal Sts., for the new Shrine auditorium. John C. Austin, 1125 Baker-Detwiller Building and A. M. Edelman, H. W. Hellman Building, associate architects. G. Albert Lansburgh, San Francisco, consulting architect. Plans for the class "A" building to be erected to replace the old auditorium will be ready for figures in about 60 days.

Calif., Los Angeles—Bank—Architect Edwin Bergstrom, 1128 Citizens National Bank Bldg., is completing plans for a 1-story building, to be erected at the northwest corner of Fair Oaks Ave. and El Centro Sts., So. Pasadena, for the South Pasadena Home Commercial & Savings Bank; $20,000; brick construction, concrete and steel vault, tile floor, plate glass sides, interior fixtures.

Calif., San Francisco—Salesrooms—C. B. and J. G. Weil are planning the erection of a four-story concrete building on the east side of Fremont Street, north of Mission, to be used as salesrooms and loft; estimated cost, $85,000.

Calif., San Diego—Hospital—Lange & Bergstrom, 819 Timken Bldg., San Diego, were awarded contract at $482,500 for erecting wards and service building at hospital, San Diego, under spec. 4636. The bid was on items 1 and 2, and specified 300 days time limit.

Calif., Los Angeles—Apartment-Hotel—Architect H. H. Whiteley, 520 So. Western Ave., is preparing plans and will supervise the construction of a $1,750,000 Spanish and Italian 7-story apartment hotel building on the Brokow property, Hollywood Blvd., between Gower and Carlos Sts., and Bronson Ave. for the Davenport Corporation. It will contain 717 rooms, divided into 279 apartments and sixteen 2-story integral studios, basement and sub-basement containing electric heating system, ice plant, 250-car garage, commissary grocery, barber shop, beauty parlors, tea rooms, laundry. Four wings each, 150 x 75 ft., lobby 50 ft. diameter in first story; also 20 street shops, bank, palm room, club rooms, dining room, kitchen and 64 x 88 ft. auditorium. Four passenger and service elevators. Each apartment will have electric stoves, frigidors, disappearing and davenport beds, tile baths and kitchens, part hardwood and enamel trim. Cross-shaped foundation, 350 x 250 ft., steel frame, brick filler walls, stucco exterior, tile roofing, Oriental rugs over tile corridor floors, tile lobby floor, found. landscaping, vacuum cleaning system. Each end apartment will have tile patio on the roof of the outer and lower apartment.

Calif., Oakland—School—The Oakland Board of Education awarded contract for the construction of the Roosevelt High School to M. C. Vaughn at $422,500. The school will be located on Nineteenth avenue and East Nineteenth Street and will be equipped with radio and every modern device.

Calif., Fresno—Association Building — The building committee of the Y. W. C. A. unanimously accepted the completed plans of the new activities building to be erected at the corner of Tuolumne and L Streets. At the same time Miss Julia Morgan, architect of San Francisco, was authorized to let contracts for the erection of a two-story class "A" activities building of reinforced concrete. On the first floor a swimming pool, gymnasium, lobby reading room, parlors, tea room and general office will be included. The second floor will contain club rooms, parlors, rest rooms and three suites.

Calif., Sacramento—Hospital—George Wagner, of San Francisco, has charge of the erection of the new Sutter Hospital, 28th and L Streets, on a cost plus basis. It is estimated that the entire cost will be approximately $650,000.

Calif., Huntington Beach—City Hall—Richard Drew, chairman of the Board of Trustees of Huntington Beach, has announced that Walker & Eisen, architects, are preparing plans for the new city hall which will cost $65,000 and an auditorium for the city which will cost $25,000. The city hall will be of class "C" construction, having plastered exterior with cast stone facings. The lower story will house fire department, jail and police department, as well as the city gas department. The second story will be divided into a council room, and offices for the City Engineer, City Attorney, City Clerk and other officials. The auditorium also will be of class "C" construction, with plastered exterior and cast stone facings. A stage has been provided for local theatrical work and the floor of the main auditorium will be so constructed as to permit its use as a banquet hall or for dances and similar entertainments.

Calif., Hollywood—Church—Plans have been approved by the building committee of the First Methodist Church South, of Hollywood, for a building to be erected on the northwest corner of Sunset Boulevard and Poinsetta Street, to cost, equipped, approximately $90,000. Working drawings are being prepared by Robert H. Orr, architect.

Calif., San Francisco—Apartments—A three-story and basement Class "C" apartment building will be erected by C. S. Grillo on the north side of Turk St., west of Leavenworth at a cost of $50,000.

Calif., Arrowhead Lake—Hotel—Plans for a new $500,000 hotel building at Arrowhead Lake have been announced by Andrew Warmington, director of sales of the Arrowhead Lake Development. Arrangements have been concluded whereby A. L. Richmond, owner and operator of the Arlington Hotel of Santa Barbara, will build and manage the new Arlington Lodge, as it will be known, at Arrowhead Lake. The entire investment will reach over $500,000 and the architecture of the lodge, designed by Architects Swasey and McAfee, will follow the lines of the old Norman type, which is being extensively used in Arrowhead Woods.

Calif., Ontario—School—Work on the new Junior High School, being erected on J Street at a cost of $65,000, is progressing satisfactorily now, though it was delayed for a time by inability to procure materials. It is expected that the new structure will be completed and ready for use early next yeear. The Eighth Street school is being moved to form a unit with the new building, and will be placed in the rear of it. The Eighth street structure was so large it was necessary to cut it in halves and move these separately. F. K. Edwards, who has the contract for the Junior High School, reports that the foundation has been completed and the forms for the concrete work are now being made.

Calif., Los Angeles—Apartments—Architects Aleck Cullett and Claud Beelman, 408 Union Bank Bldg., have prepared preliminary plans for a 12-story class "A" apartment house at Hollywood Boulevard and Fuller Avenue for A. C. Blumenthal and Assoc. It will contain 500 rooms and will cost $1,750,000. The site is located in a residential zone and application has been made to the city council to change the zoning ordinance to permit the erection of the apartment house.

Calif., El Monte—Store—Architects Walker & Eisen, 325 Pacific Finance Bldg., are preparing plans for a 1-story brick store and theatre building at El Monte for Walter E. Temple. Brick walls, 85 x 135 ft., press brick facing, plate glass, steel beams, composition roofing, metal skylights, cement floors; $40,000.

Calif., Los Angeles—College—Architect Albert C. Martin, 430 Higgins Building, has prepared preliminary plans for a 4-story brick building to be erected on Hill St., between 11th and 12th Streets, for Southwestern University. J. J. Schumacher, business manager, Wilcox Bldg. It will be brick construction with stores in first story and university departments above; $90,000.

Calif., Porterville—Offices—De Luxe Building Company, Los Angeles is preparing plans and will erect a bank, store and office building at Porterville, for First National Bank of Porterville; banking space, 20 offices, and 8 stores. Brick walls, pressed brick front, 2-story, 60 x 121 ft., tile roofing, tile and hardwood floors, plate glass, steam heating system, wrought iron work, hardwood trim, basement, copper, store fronts; $68,000.

Calif., Hollywood — Club — The Milwaukee Building Company, Wright-Callender Building, is preparing plans and will erect a $300,000 10-story concrete and hollow tile athletic club building at Sunset Blvd. and Hudson St., for the Hollywood Athletic Club. The basement will have a barber shop, Turkish baths, showers, dressing rooms, storage rooms, power plant and 1000 lockers. The first story will contain lobby, lounge, women's and men's check and rest rooms, main and ladies dining rooms, 350 lockers, gymnasium, 56 x 90 ft., with spectators balcony, natatorium, 56 x 80 ft., with swimming tank, 30 x 60 ft. The second story will have game rooms, private dining rooms, and four handball courts. The upper floors in the tower will contain 56 sleeping rooms each with bath. Stucco exterior, art stone trim, tile and composition roofing, tile and hardwood floors.

Calif., Los Angeles—Store—Stanton, Reed & Hibbard, 620 Metropolitan Bldg., have completed plans for a class "A" store and loft building, to be erected on Broadway between 6th and 7th Streets for Starr Piano Company. It will be 8-story, basement and intermediate floor; 38 x 140 ft., steel frame construction, single span, reinforced concrete floors, freight and passenger elevators, marble and tile work; $250,000. Structural steel contract has been let to Baker Iron Works. All other work will be included in the general contract. Bids will be taken this week.

Calif., Los Angeles—Store—C. A. Edwards, Citizens National Bank Bldg., has the contract for excavating for the ten-story addition to be erected to the J. W. Robinson Co. department store building at 7th Street and Grand Avenue. The building will be 60 x 330 feet and will extend from Grand Ave. to Hope St. Scofield Engineering Construction Co., Pacific Finance Building, has the contract on a percentage basis for erecting the addition. Dodd & Richards, 905 Brack Shops Bldg., architects. Steel frame construction, brick walls, pressed brick and terra cotta facing, plate glass, reinforced concrete floors, elevators, hardwood trim; $1,000,000.

Calif., Glendale—Structural Steel—Brombacher Iron Works, 1666 Long Beach Ave., was awarded a contract at $15,250 for furnishing and erecting struc. steel for the class A store and office building at Glendale for John Lawson; Alfred F. Priest, 619 Fay Bldg., architect.

Calif., Arcadia—Store—E. H. & J. A. McDonald, formerly of Monrovia, will build a store building on East Huntington Drive, to be occupied by their electrical goods store.

Calif., Merced—Gymnasium—Architects W. J. Wythe, Central Bank Bldg., Oakland, and W. E. Bedesen, Merced, are preparing working drawings for a reinforced concrete and terra cotta gymnasium for Merced High School District. Estimated cost $75,000. The building will have tile roofing.

Calif., Long Beach — Mausoleum — Cecil E. Bryan Company, Inc., engineers, Chicago, has prepared plans and will build a $300,000 concrete Spanish mausoleum structure on a 5-acre site at Cherry Ave. and Whittier Blvd., for the Sunnyside Mausoleum Co., 342 American Ave., Long Beach. Foundation 200 x 102 ft., 1,000 crypts, 1,000 sarcophagi, niches, chapel 25 x 70 ft., pipe organ, chimes tower, rest rooms, offices, art glass windows, marble inter., bronze trim, ventilating system.

Calif., Santa Barbara—Club—Snook & Kenyon have the contract at about $75,000 to erect the new University Club bldg. at Santa Barbara and Sola Sts. Soule, Murphy & Hastings, architects. It will be 2-story of Spanish Colonial style with a tile roof. Work will start at once.

Calif., Riverside—School—Architect G. Stanley Wilson has been commissioned to proceed with cost estimates, etc., for a ten-room school bldg. to supplement the Lincoln school on W. 6th St. Concrete construction, 2-story. The plans have been approved. Cost will be defrayed from $225,000 grammar school bond issue voted recently.

Calif., San Diego—School—Eckels, Lowerson & Wolstencraft have the contract at about $42,000 to build the new parish school of Our Lady of Angels, at 24th and Market Sts. Plans by Architect J. E. Lovess. Building will be 2-story, 75 x 80 ft., of brick and terra cotta constr., and contain 8 classrooms, offices, teachers' rooms, accommodating 400 pupils. Building will have hardwood floors throughout. Work has started.

Calif., Santa Barbara—Hotel—Architect Leonard A. Cooke has completed plans for a 4-story modern hotel bldg., to be erected on East Haley St. for Dwight Faulding, photographer. Eighty-four rooms, 28 with baths, steam heating, etc. The ground floor will have lobby and stores. Est. cost, $60,000.

Calif., Long Beach—School—Architects John C. Austin, 1129 Baker-Detwiler Bldg., L. A., and W. Horace Austin, 222 First Nat'l Bank Bldg., Long Beach, assoc., have been commissioned to prepare plans for a $100,000, 2-story brick elementary school at 14th St. and Pacific Ave., Long Beach. Nine standard classrooms, administration offices, open air study rooms and kindergarten.

Calif., Long Beach—City Hall—Bids are being received by City Manager Hewes, Long Beach City Hall, for completing the interior of the new city hall in Long Beach. Work will include finish cement surface on four floors and basement, hollow tile partitions, steam heating, plumbing, painting, wiring, vault, jail cells and corridors, elevators. Bids will be taken separately and as a whole. W. Horace Austin, 222 First National Bank Bldg., Long Beach, architect; $200,000 available.

Calif., Glendale—Convent—General Construction Co., 249 N. Brand Blvd., has been awarded a contract at $106,000 for all work complete for erecting a convent near Alhambra for the Carmelite Sisters, 622 W. 18th St., L. A. John C. Austin, 1125 Baker-Detwiler Bldg., architect. The bldg. will be 2-story 120 x 120 ft., containing chapel, sleeping rooms, baths, etc.; reinforced concrete const., plaster exterior, cast stone work, clay tile roofing, pine trim, beech floors, tile floors in bathroms, gas heating.

Calif., Santa Monica—Bank-Office—Richardson Bldg. & Engr. Co., 1126 Story Bldg., has the general contract at $28,200 to erect a 2-story and basement brick bank and office bldg. at 3rd St. and Santa Monica Blvd., Santa Monica, for Citizens State Bank of Santa Monica. Plans by Archt. C. F. Plummer, 1108 Story Bldg. Brick walls, terra cotta front, 2-story, 43 x 45 ft., steel columns, comp. rf., tile, marble and concr. floors, reinf. concr. vault, vault door, granite base, O. P. trim, plate glass, steel sash, metal skylights, ornam. wrought iron grille work.

Calif., Pomona—Bank—Architects Aleck Curlett and Clud Beelman, 408 Union Bank Bldg., are preparing plans for a 5-story, mezzanine story and basement, class A bank and office bldg. to be erected at Pomona for the First National Bank of that city. The bank will occupy a space 69 x 90 ft., with safe deposit dept. in the basement. There will also be one storeroom in the first story. Each of the upper stores will contain 20 offices, dimensions 60 x 120 ft., reinforced concrete construction, brick filler walls, terra cotta and press. brick facing, plate glass, marble and tile work, comp. roofing, hardwood and pine trim, 2 elec. elevators, steam heating, etc. Plans will be ready for figures in 30 days. The bldg. will cost $225,000.

Calif., Venice—Auditorium—Under the proposed municipal improvement program, city trustees wish to build a municipal auditorium, library and chamber of commerce building, with

band stand. It is proposed to construct a building with plaza having seating capacity of 2,000 or more, and parking space for 5,000 machines.

Colo., Denver—Refinery—The Producers and Refiners Corporation has taken title to a tract of 80 acres just west of Casper, Wyo., upon which will be erected the largest casing head gasoline plant in one unit in the world. This plant, which will be built by the Hope Engineering Company, will be in operation by Nov. 1 and will treat approximately 30,000,000 cu. ft. of natural gas per day. Simultaneously with the construction of the Casper plant the corporation will begin the erection of a compression casing head plant at Riverton with a capacity of 5,000,000 cu. ft. per day. Other units will be added to this plant as necessary.

Colo., Denver—Freight House—P. J. Sullivan has been awarded contract for the construction of the new Union Pacific freight house, to be erected between 19th and 21st on Wynkoop St. The proposed building will cost approximately $230,000.

Colo., Denver—Offices—Plans are being prepared for a five-story building to be erected by the Three Rules Dry Goods Company at West Irvington Place and Broadway. H. C. Cones is president of the company. Work will start in the spring.

Colo., Denver—Garage—Jas. A. Curran will erect at the corner of Broadway, Arapahoe and 23rd Streets a new garage to house the motor vehicles for the post office department.

Colo., Denver—Hospital—Arvid Olson was the low bidder on the excavating and sub structure work of the new University of Colorado medical school and general hospital to be built at Eighth and Colorado Boulevard. Bids for other phases of the construction work are now being received by the architects, Briscoe, Fisher and Fisher, under the direction of the board of regents, of which group Thomas I. Wilkinson, a prominent mining engineer, is the chairman on construction.

Colo., Denver—Apartment—A forty-one apartment building costing $70,000 has been started at 930 Acoma St., close to the down town section, by the Western Finance Development Co.

Ore., Bend—Lodge—Plans for a $75,000 Odd Fellows Building at Bend, Ore., have been prepared by Tourtellotte and Hummel of this city. The new building will be three stories in height with stores on the street level, and on the upper floors, some offices in addition to banquet and lodge rooms.

Ore., Portland—Hotel—The construction of a ten-story hotel to cost in excess of $1,000,000 has been announced by O. K. Jeffrey and his associates. The hotel will occupy a part of a tract 200 x 220 ft., facing Washington Street between Twentieth and Ella Streets. Sutton and Whitney have been retained as architects.

Ore., Portland—Apartment—Plans for a modern nine-story apartment hotel to occupy a quarter block have been completed by Carl Linde for the Regent Investment Company. Cost to be around $350,000.

Ore., Salem—School—A new dormitory at the Chemawa Indian School will be erected by Hughes and Pugh, contractors of Salem. The bid of the local firm was slightly over $52,000. The new building will replace Brewer Hall.

Ore., Medford—Armory—Bids for a new armory were opened Sept. 30. It has been unofficially stated that the bid of Stephenson & Kaulbach, of Portland, for a concrete structure would be accepted. Completion within four months will be required.

Ore., Portland—Hotel—A new three-story hotel and apartment house costing with the site, about $80,000, is to be erected at the southeast corner of Grand Ave. and Taylor St. Work will be started next month. C. L. Goodrich is the architect.

Ore., Portland—High School—Approval of the general plans for the new Grant High School has been given by the school board and the architects, Knighton and Howell, were instructed to proceed with the working drawings. Construction will start about the first of the year. This building, which will be located on a 29-acre tract, will be built in units as the need develops. The total cost is estimated at $400,000.

Ore., Portland—Plans for a one-story concrete building to cost $28,000 have been prepared by Houghtaling and Dongan, architects. The building will be occupied by the Roberts Motor Car Company. The plans call for a light repair shop, a large stock room and a combined show and storage room.

Ore., Portland—Lodge—The new $75,000 addition to the Washington Masonic lodge building at East Eighth and Burnside streets will be started within the month, according to the plans of the building committee, which has been working on the project for the past six weeks. In addition the Artisans announced that a temple costing $40,000 will be erected by Al Azar Pyramid of that organization at the southwest corner of Third and Columbia streets. The building already owned by the order and to which the addition will be joined is valued at $75,000. Drawings and plans have been completed by C. C. Robbins, architect, and the bids will be received as soon as the final details are settled by the building committee. The structure will provide a 50 x 85 ft. ball room or banquet hall as the occasion demands, and the first floor surrounded by a mezzanine balcony with reception and cloak rooms. The second floor will be so constructed that it will serve as an amphitheater with a stage at one end and with a seating capacity of 900.

Ore., Portland—Apartments—Peters Construction Company is planning to erect a two-story and basement concrete and brick apartment building at the northwest corner of Tenth and College Streets, to cost approximately $70,000. Claussen & Claussen have prepared plans for the new structure. The building is to be ready for occupancy Dec. 1.

Ore., Eugene—University Buildings—Plans are being prepared under the direction of E. F. Lawrence, dean of the school of architecture, University of Oregon, for a new building to house the school of art and also a wing on McClure hall to provide quarters for the departments that suffered in the recent campus fire. The new structures will cost approximately $65,000.

Utah, Huntington—School—Ground has been broken for the erection of a new public school building to replace the old one destroyed by fire, on Main Street opposite the city park. The building, which will cost $41,500, will be 66 x 148 ft. and contain twelve rooms. Construction of other school buildings in Orangeville, Emery and Clausen also will begin soon.

Utah, Salt Lake City — Residences — Thirty-eight houses will be erected in the immediate future on a five-acre tract at Twenty-first South and State Streets, by the Halloran-Judge Trust Company of Salt Lake City.

Utah, Provo—The city and county building committee and the Utah county and Provo city commissions have unanimously decided to complete the city and county building at Provo. Bids will be called for at an early date. Up to the present time the cost of this building has been approximately $340,000. It is estimated by Architect Joseph Nelson that $150,000 will complete the building, making the entire cost a little less than one-half million dollars.

Wash., Seattle—Apartments—John S. Hudson, Empire Building, will erect in Seattle a three-story apartment building, 79 x 50 ft. in size, containing twenty two and three-room apartments, and costing $48,000.

Utah, Salt Lake City—Bank—P. J. Walker, of P. J. Walker & Co., San Francisco, has been appointed supervising contractor for the new bank and office building of the Continental National Bank. Detailed plans of the new building are not yet complete but approved sketch provides for 17 stories above the banking rooms. Plans are being prepared by George W. Kelham, San Francisco architect.

Wash., Seattle—Hospital—Plans for the proposed General Hospital of Everett, in the hands of Stevens & Lee, Boston architects, are to be revised before contract is awarded, according to A. H. B. Jordan, president of the hospital association. When the plans are revised, new bids will be called. The lowest estimate received when bids were opened recently was $267,400.

Wash., Seattle—Lodge—The B. P. O. Elks are planning a million dollar addition to their present home on land adjoining the present building. Work will be started within three months, according to announcement by J. C. Slater, chairman of the ways and means committee. Prizes will be awarded to the architects submitting the two best plans for the new club house.

Wash., Tacoma—Hotel—Within 10 days, the question of Tacoma's new hotel site will be determined upon by the 2,800 stockholders of the $1,000,000 fund. Eighteen sites have been submitted to the trustees, and the stockholders will determine the matter. H. A. Rhodes is president of the Citizens Hotel Corporation.

Wash., Seattle—School—Plans for a proposed school for St. Mary's Parish, to cost $80,000, have been completed by Lundberg & Mahon, Lyon Building. Building will be three stories, 152 x 77 ft., of mill construction, and will be built by day labor.

Wash., Seattle — Apartment — Plans for a $65,000 apartment building, to be 107 x 57 ft., containing 35 apartments, for P. A. Tramontin, 3902 Burke Avenue, have been completed, and bids will be called for at once

Wash., Tumwater—Brewery—The old brewery belonging to the Phez Company has been sold to a group of Salem, Ore., business men, who will remodel the plant and equip it for the manufacture of high grade paper. The new corporation will be known as the West Coast Pulp and Paper Company.

Wash., Seattle — Apartment — Plans for a $175,000 bachelor apartment house to be constructed in Seattle are nearing completion by Architect Emil Guenther. Structure will be five stories high, 120 x 60 ft., and will contain 53 two-room suites, and 4 three-room apartments. Williams & Company represent the owners.

Wash., Seattle—Apartment—Plans for a three-story and basement apartment house have been completed by J. E. Douglas, and the contract awarded to Contractor E. A. Wisner for the structure. Building will be 100 x 50 ft., containing eight three-room apartments on each floor, and will cost $50,000.

Wash., Everett—Theater—The owners of the Everett Theater have commissioned H. Ryan, architect, Seattle, to prepare plans for remodeling the theater throughout, at a cost of more than $100,000. Steel and concrete will replace all the timber in the structure, and the seating capacity will be increased from 800 to 1,500. Inclines will replace stairways and the structure made strictly modern.

Wash., Kelso—Hotel—The Long-Bell Lumber Company has awarded to the West Lake Construction Company, of St. Louis, contract for the erection of a $350,000 hotel at the company's new townsite near Kelso.